

## Research

In technology, before you start designing and making a product, you will need to RESEARCH key areas so that the product you design and make is as successful as it can be. Your research will cover;

**CLIENT** – who is going to buy your product? Who is it designed for?

**AESTHETICS** – what will your product look like? – shape, colour etc.

**MATERIALS** – what materials will you want to use and why?

**ENVIRONMENT** – what affect will your product have on the environment.

**SAFETY** – what safety considerations will you have to think about before making the product?

## Designing

Designing is the creative process of drawing your ideas onto a design sheet.

You will develop a range of design (4 or more).

You will develop skills in creatively presenting a range of ideas through annotated sketches, models and computer models.

We look at getting constructive feedback from the class to help improve your ideas before we start manufacturing. ALL designs need to be clearly annotated.

**ANNOTATION** - a note to explain or comment added to your design.

## Manufacturing

Manufacturing is when we start to make our designed products. We will use a range of techniques, tools and equipment in the manufacturing process.

## Testing & Evaluation

You will test your product against your SPECIFICATION and RESEARCH see if it has been successful. Testing may include actually using the product and getting feedback from the class.

### TIER 2 KEY WORDS

**DESIGN** - a drawing produced to show the look and function of a product

**PLAN** - a detailed proposal for doing or achieving something.

**COMPARE** - estimate, measure, or note the similarity or dissimilarity between.

**ANALYSE** - examine (something) methodically and in detail,

### MATERIALS

**RECLAIMED TIMBER** – Is a natural wood, that is usually cost effective, easy to shape and work with and environmentally aware..

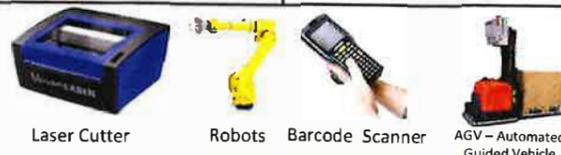
**ACRYLIC** – is a thermoforming plastic – it comes in a range of colours and sheet sizes. It has a colourful shiny finish but can shatter when being cut.

**MILD STEEL** – is a shiny, silvery metal when cleaned up. Once heated can be shaped and bent into different forms.

**ABS PLASTIC** – is a thermos plastic that can come in powder form. It can be used in the DIP COATING process and comes in a range of colours.

### 2. CAM – Computer Aided Manufacturing

Advantages of CAM	Disadvantages of CAM
Quick – Speed of production can be increased.	Training is required to operate CAM.
Consistency – All parts manufactures are all the same.	High initial outlay for machines.
Accuracy – Accuracy can be greatly improved using CAM.	Production stoppage – If the machines break down, the production would stop.
Less Mistakes – There is no human error unless pre programmed.	Social issues . Areas can decline as human jobs are taken.
Cost Savings – Workforce can be reduced.	



### CAD – Computer Aided Design

Advantages of CAD	Disadvantages of CAD
Designs can be created, saved and edited easily, saving time	CAD software is complex to learn
Designs or parts of designs can be easily copied or repeated	Software can be very expensive
Designs can be worked on by remote teams simultaneously	Compatibility issues with software
Designs can be rendered to look photo-realistic to gather public opinion in a range of finishes	Security issues - Risk of data being corrupted or hacked
CAD is very accurate	 CAD Software
CAD software can process complex stress testing	

## Material Properties

<b>Strength</b> The ability of a material to stand up to forces being applied without it bending, breaking, shattering or deforming in any way.
<b>Elasticity</b> The ability of a material to absorb force and flex in different directions, returning to its original position.
<b>Ductility</b> The ability of a material to change shape (deform) usually by stretching along its length.
<b>Malleability</b> The ability of a material to be reshaped in all directions without cracking.
<b>Hardness</b> The ability of a material to resist scratching, wear and tear and indentation.
<b>Toughness</b> A characteristic of a material that does not break or shatter when receiving a blow or under a sudden shock.

### Selection of materials or components

When selecting materials and components considering the factors listed below:

- Functionality: application of use, ease of working
- Aesthetics: surface finish, texture and colour.
- Environmental factors: recyclable or reused materials, product mileage.
- Availability: ease of sourcing and purchase.
- Cost: bulk buying.
- Social factors: social responsibility.
- Cultural factors: sensitive to cultural influences.
- Ethical factors: purchased from ethical sources such as FSC.

What is the FSC? <http://www.fsc-uk.org/en-uk/about-fsc/what-is-fsc/fsc-principles>

### KEY WORD FOCUS

You should be able to explain the meaning of each of these words by the end of this rotation.

<b>GSM</b>	Grams per Square Metre
<b>Microns</b>	Thickness of paper or card. 1000microns = 1mm thickness

## Paper

Type	Description and uses
Layout paper	<ul style="list-style-type: none"> <li>• lightweight, thin white paper</li> <li>• used for initial ideas</li> <li>• takes colour media well</li> <li>• low cost</li> </ul>
Tracing paper	<ul style="list-style-type: none"> <li>• thin, translucent paper</li> <li>• making copies of drawings</li> <li>• high cost</li> </ul>
Cartridge paper	<ul style="list-style-type: none"> <li>• good quality white paper</li> <li>• available in different weights</li> <li>• general purpose work</li> <li>• can be used to make simple models</li> <li>• medium cost</li> </ul>
Bleedproof paper	<ul style="list-style-type: none"> <li>• smooth, hard paper</li> <li>• used with water-based and spirit-based felt-tip pens</li> <li>• medium cost</li> </ul>
Grid paper	<ul style="list-style-type: none"> <li>• printed square and isometric grids in different sizes</li> <li>• a guide for quick sketches and working drawings</li> <li>• low cost</li> </ul>

### Properties of paper and boards.

Type	Weight or thickness	Uses	Relative cost (10= high)
Newsprint	50gsm	Newspapers	1
Layout Paper	60gsm	Sketches and tracing	3
Tracing Paper	70 gsm	Tracing	4
Sugar Paper	90gsm	Cheap mounting work	2
Inkjet/Photo paper	150-230gsm	Photos/Pres entations	9
Board (Card)	230-750 microns	Model-making	5
Mount Board	230-1000 microns	Model-making, High picture quality mounting	9
Corrugated Card	3000-5000 microns	Packaging protection	5

### Scales of Production

**One off:** when you make a unique item

**Batch:** when you make a few/set amount

**Mass:** when you make thousands

**Continuous:** open ended production

# KS3

# Paper and Board Knowledge Organiser

## Boards

Type	Description and uses
Corrugated card	<ul style="list-style-type: none"> <li>• strong and lightweight</li> <li>• used for packaging protection and point of sale stands</li> <li>• available in different thicknesses</li> </ul>
Duplex board	<ul style="list-style-type: none"> <li>• large foam-based board</li> <li>• different finishes available including metallic and hologrammatic</li> <li>• used for food packaging, e.g. take-away pizza boxes</li> </ul>
Foil lined board	<ul style="list-style-type: none"> <li>• quality cardboard with a aluminium foil lining</li> <li>• ideal for ready made meals or take away meal cartons</li> <li>• The foil retains the heat and helps keep the food warm</li> </ul>
Foam core board	<ul style="list-style-type: none"> <li>• very light, very stiff and very flat.</li> <li>• It has a white, rigid polystyrene foam centre, with smooth white paper laminated onto both faces.</li> <li>• It is easy to cut with a knife, a mount cutter or on a wall cutter</li> <li>• great for modelling</li> </ul>
Ink jet card	<ul style="list-style-type: none"> <li>• Has been treated so that it will give a high quality finish with inkjet ink</li> <li>• available in matt and gloss</li> </ul>
Solid white board	<ul style="list-style-type: none"> <li>• top quality cardboard made from quality bleached wood pulp.</li> <li>• used for hard backed books and more expensive items</li> <li>• excellent print finish</li> </ul>

### Paper and Boards- Stock sizes and weights

Paper and board is available in sizes from A0 (biggest) to A7 (smallest). The most common size is A4.

Each size is half the one before, eg A4 is half the size of A3.

They are also sold by weight: GSM – grams per square metre.

Card thickness or calliper is traditionally measured in Microns. 1000 Microns = 1mm, so the higher the value, the thicker the card or paper.



## Key Designers:

**William Morris** (24 March 1834 – 3 October 1896) was an English textile designer, poet, novelist, translator, and socialist activist. Associated with the British Arts and Crafts Movement, he was a major contributor to the revival of traditional British textile arts and methods of production.



**Henry Charles Beck** (4 June 1902 – 18 September 1974), known as **Harry Beck**, was an English technical draughtsman best known for creating the present London Underground Tube map in 1931.



**Dyson Ltd.** is a British technology company established by James Dyson in 1987. It designs and manufactures household appliances such as vacuum cleaners, hand dryers, bladeless fans, heaters and hair dryers.

