Unit A
Materials, Components & Application
Papers & Boards
Types of paper

- Designers need to demonstrate ideas or final products to clients in order to get feedback for the future success of the proposed solutions.

**Cartridge Paper**

- Good surface for sketching
- Using coloured pencils for rendering
- Water colours can be used **BUT** paper needs to be stretched to prevent ‘cockling’ (*water colour papers are available*)

- Heavier papers are more versatile, less prone to yellowing with age and likely to be acid-free.
Watercolour Paper

- Provide a good surface texture that will accept acrylics, gouache, pastels and watercolours.
- There are three main textures available
  - Hot-pressed paper- smooth hard finish
  - Cold-pressed paper- rougher surface which enhances finished image as more colour can be absorbed
  - Third type is rougher than cold-pressed paper with more peeks and hollows (known as tooth) on the surface.

Bleed proof/marker paper

- Similar to cartridge paper, but a protective layer on the reverse to stop the marker bleeding through to the next sheet.
Layout Paper

- Used by designers—particularly advertisers
- It has partial transparency so designers can trace through previous design ideas to adapt and develop.

Ingress paper

- Used with pastels though pastels can also be used with sugar papers which give a more textured surface.
Papers Properties & Uses

• Most important properties for papers are:
  – BRIGHTNESS (degree to which they reflect light)
  – COLOUR
  – OPACITY
  – GLOSS

Opacity

• An opaque paper will allow little or no ‘show through’ of the image on the other side.
• Most desirable feature for printing and writing papers.
Gloss, glare, finish, smoothness

- Gloss refers to surface lustre
- Glare refers to the way the paper reflects light
- Finish refers to the general surface characteristics of the paper
- Smoothness refers to the absence of surface irregularities.
Strength & Durability

- Strength of paper is determined by:
  - Strength of individual fibres
  - Average length of fibre
  - Strength of bonds between fibres
  - Structure of the paper

**Strength rapidly decreases with the increase of moisture- which breaks down the inter-fibre bonding.**
Tensile Strength

- Most papers require a certain minimum strength to withstand the production process: including printing, embossing and folding, as well as handling.

Bending strength

- The thinner the sheet, the more flexible and light it is; conversely the thicker and heavier the paper is, the more stiff it is.

Porosity

- Is reduced with the addition of size to the paper. Greaseproof paper is made by beating the paper, resulting in a dense sheet with very little porosity.
The term ‘carton board’ covers a range of packaging materials from a single layer card for products such as cereal packages or soft drinks cartons (with a sealing layer of polymer) through to multi-layer corrugated cardboard boxes in a variety of weights and thicknesses, for shoe boxes or electrical goods.
Cards & Boards

- Carton board is produced from recycled carton board and paper as well as some new wood fibres.
- The material can be bleached or unbleached and has a surface that can be readily printed on.
- The thinner carton boards usually have one printable white surface, the reverse remaining self-coloured.

- Packaging made from carton board consists of folded and glued shapes- the shape giving the packaging its strength and rigidity.
Manufacturing with papers and boards

Papers and boards are used widely in the manufacture of products such as:

- Packaging for flat-pack products
- Packaging for flowers
- Packaging for electrical goods
- Paper cups
- Newspapers
- Magazines
Special papers
- *model making*

- Pearlescent
- Holographic
- Mirrored
- Metallic effects
  - Brushed steel
  - Anodised aluminium
  - Galvanised steel
Printing Holograms

Certain techniques of printing have allowed development in printing holograms onto high security items such as bank notes *(which are in a form of high grade plastic paper that have been treated with specific techniques such as watermarks and metalised strips)* and credit/debit cards.
Foam Boards

- Foam boards are a multi-layer board made up of two outer layers of card.
  - Outer surfaces have a high gloss finish
  - Middle layer is foam

- Foam board has a number of uses in the design process from mood and presentation boards to use as a modelling material.
- It is generally light in weight
- Easy to cut
- Difficult to bend
Correx Boards

- Boards are made by extruding a thermoplastic to produce a sheet material that is useful for the manufacture of simple products.
- It is lightweight and durable.
- It can easily be bent in one direction only.
- Special fasteners can be used with correx making it possible to manufacture products.
Printing Processes

Commercial printing processes include:

- Lithography
- Letterpress
- Flexography
- Gravure
- Screen printing
Printing Processes

Relief Printing
- Letterpress
- Flexography

Gravure

Screen Printing

Lithography
- Offset lithography

Electrostatic printing processes
- Electrophotographic
  - Inkjet
  - Microcapsule
- Thermal subliminal and wax transfer
Lithography
Lithography

The process
• The process works because oil does not mix with water.
• The plate to be printed is coated with a type of oil, then rinsed, dampened with water and coated with ink.
• The ink only sticks to the parts of the plate that are not wet with water.
Uses for:
- Magazines
- Newspapers
- Leaflets
**Good points:** Can print long runs at a low cost, can print both colour and black and white, good for photographs, good quality prints.
Flexography
Flexography

The Process:
- Uses a flexible printing plate.
- Ink is applied to a raised image, which transfers the image.
- It is the only printing process that can print onto plastics and metals.
What is it used for?

- plastic bags
- milk cartons
- disposable cups
- drinks cans
- sweet wrappers.
Pros and Cons

Advantages:
• Cheap
• Can do long runs
• Good quality graphics
• Lots of colours.
• Can print on flexible materials.

Disadvantages:
• Can lose quality.
• More suitable for block colours
  • The plates can need replacing.
Gravure
Gravure

The process:

- Uses cylindrical printing plates.
- The plates are usually made of steel and plated with copper and a light-sensitive coating.
- The image / text to be printed is etched into the plates by a laser in negative form.
Uses:
- art books
- greeting cards
- Advertising
- Currency
- wrapping paper
- wood laminates
- CD covers
Advantages:
• Can do long runs at high press speeds
• multi-colored
• high quality jobs
Screen printing
The Process:

- Material is placed on the base.
- A template made from card.
- A screen (made of stretched nylon with a wood frame) is placed on top of the template.
- Ink is squeezed onto the screen.
- A blade is used to spread the ink and push it through the screen and template.
Silk screen printing

Silk screen printing is a labour intensive method which forces ink through a stencil applied to a fine screen. It is often used for fabrics.
Advantages;
- Relatively cheap
- Lots of colours available.

Used for;
- T-shirts
- Posters
- Packaging
Laser printing uses a laser to apply a charge of electricity to a special drum which then picks up metal powder and transfers it to a piece of paper. It is often low quality but gives high volumes at low prices.
Die Cutting an Introduction

In industry companies need to manufacture packaging in large quantities. In order to create the packaging, nets or cutter guides have to be designed accurately so that the final product can be cut out after it had been printed.

What everyday items can you think of that have been die cut?
Everyday items

Many of the products you use everyday have been die cut: tissue boxes, stickers, cereal boxes, birthday cards and file dividers.
**Uses**

Die cutting is an extremely useful tool when designing promotional materials, point of sale and packaging particularly when larger quantities are required.
The Die Cutting Process – Stage 1

The first stage is creating a cutter guide or net for your packaging on Pro Desktop or an other CAD programmes.
The electronic file is then put into a computerised laser cutter which burns the design directly on to a wooden board, it is accurate to 100\textsuperscript{th} of a millimetre.
The operator uses the design to see where the die board (the lasered wood) should use a cutting metal rule (for cutting lines) or a blunt metal rule (for fold lines).
The Die Cutting Process – Stage 3

Metal rules are bent by hand and fitted into the wooden board where the laser cuts were made.
The operator then uses rubber to cover the blades, this helps to protect anyone handling the die board and stops the specialist machinery from getting damaged.
This job usually takes half a day to complete by an expert and can cost £80 - £160 for an A4 size dieboard.
The Die Cutting Process – Stage 4

The dieboards are inserted into a machine called a Heidleberg Cylinder.
The Die Cutting Process – Stage 4

The paper or card is fed into the machine, the cylinder makes one rotation and the dieboard makes its cut.
The Die Cutting Process – Stage 4

These automatic machines can even separate the waste and stack the cut outs, saving time and money in the finishing process of making packaging.
Theory Task 1

Make notes on Papers and Boards

Topics you must cover must include:

- Types of papers and boards
- Properties and applications of papers and boards
- Printing processes and applications
  - Lithography, letterpress, flexography, gravure, screen printing, digital printing, thermal transfer printing, dye sublimation printing.
- Die cutting

You will have an (open book) test on this next Monday…