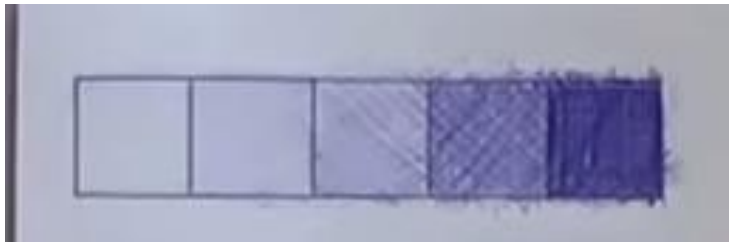
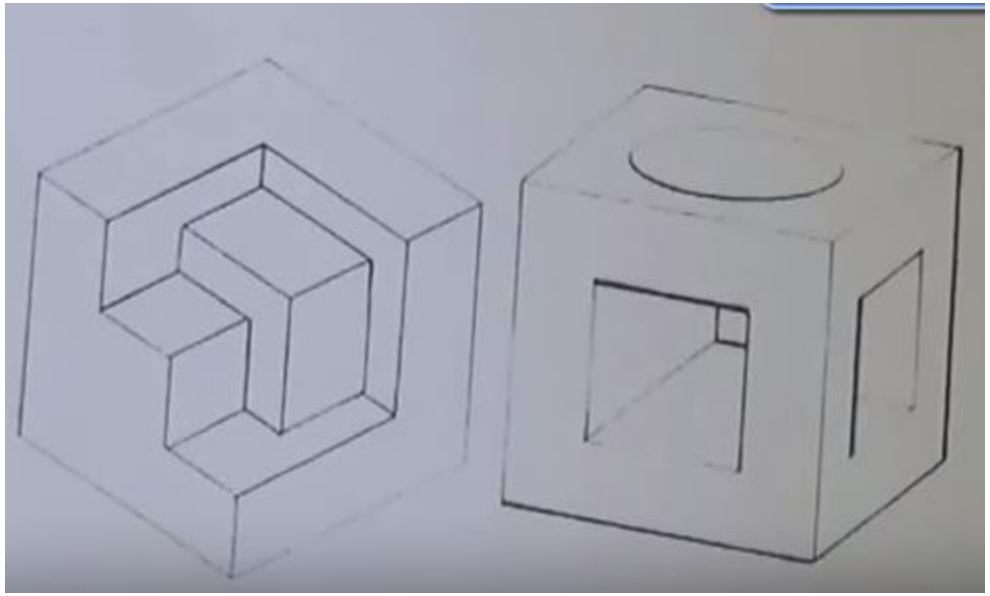
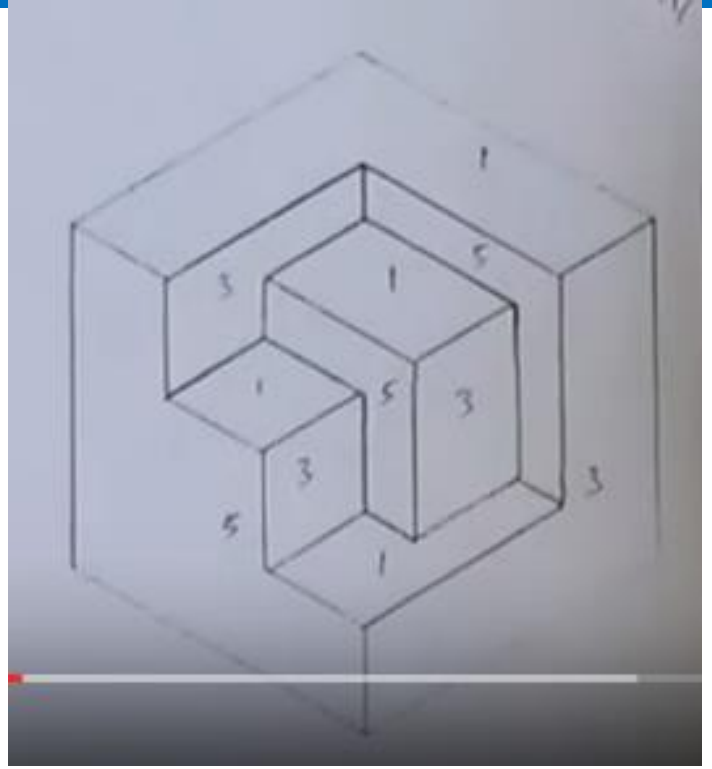
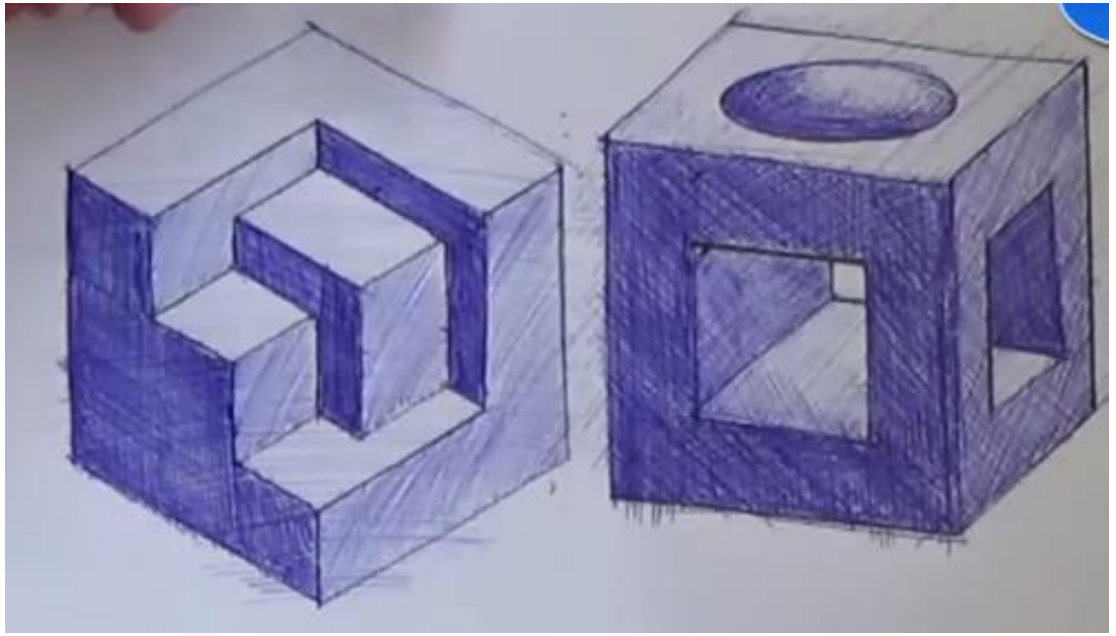
YEAR 11 MONTGOMERY FINALS REVISION

Crating









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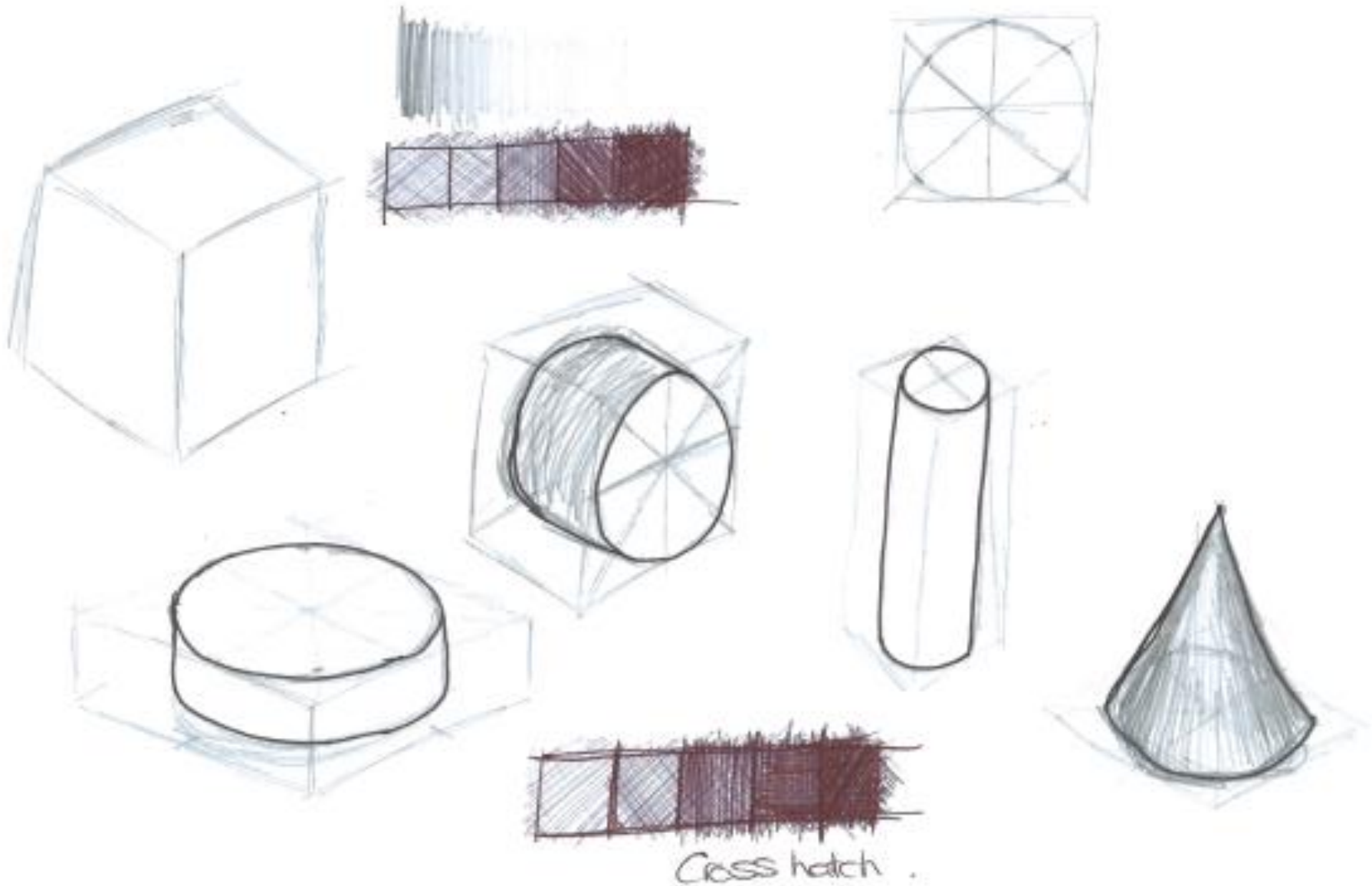
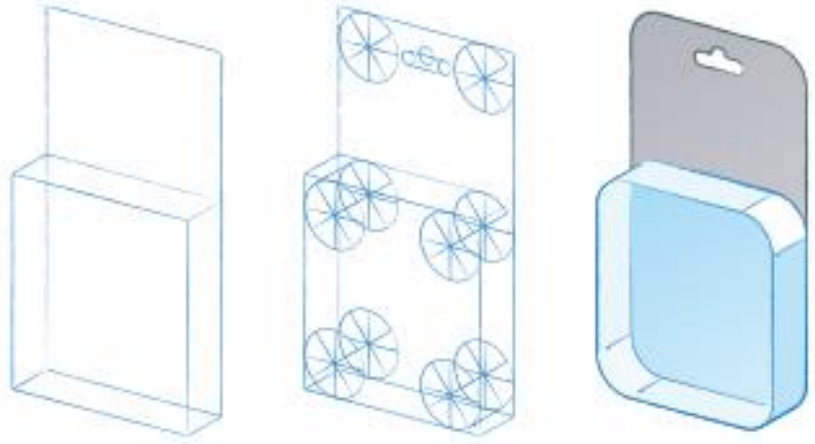

Cross hatch .

Crating

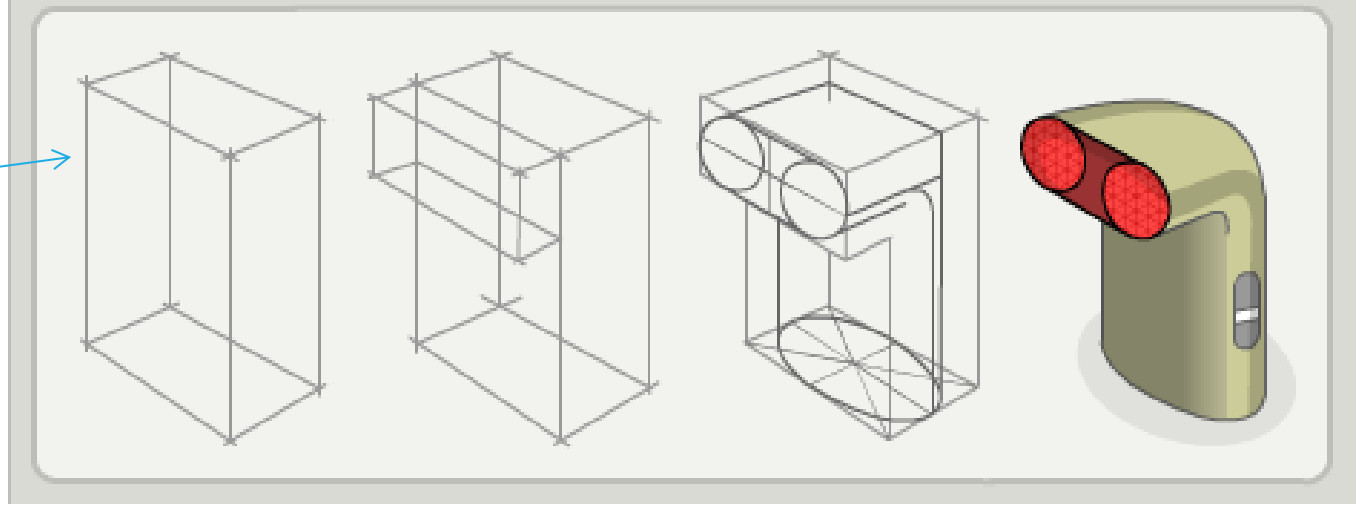
Crating

Drawing boxes or 'crates' is a useful method for creating a 3D sketch or drawing. Try to imagine the object you want to draw is inside a 3D box. Draw the box faintly and then draw the object inside, using the box (crate) as a guide.



Crating technique to draw a complex shape

Construction lines



http://www.youtube.com/watch?v=_vSQRHgnt8c&feature=relmfu

https://www.youtube.com/watch?v=PWvZsKJ3ZUA

MODELLING MATERIALS

Task One:

Put the modelling materials in order in your groups.

Task Two:

In your booklets fill in the missing words and sentences.

Task Three:

Using the information you have read complete the material questions.

VINYL CUTTER

Using the vinyl cutter produce your name in a 8cmx 8cm box.

Put these in the correct column

CAD Computer Aided Design	CAM Computer Aided manufacture

Google Sketch up

Laser Cutter

Adobe Illustrator

Plotter (Vinyl Cutter)

2D design

3D Printer

Adobe Photoshop

Microsoft publisher

Computer Aided Design	Computer Aided manufacture
Google Sketch up	Laser Cutter
Adobe Illustrator	Plotter(Vinyl Cutter)
2D design	3D Printer
Adobe Photoshop	
Microsoft publisher	
SOFTWARE	**HARDWARE**

Fun feature

SMART MATERIALS

additional notes

WHAT ARE SMART MATERIALS?

Smart materials are materials that respond to external variations in a predictable or desirable manner. Basically, the properties of smart materials change in response to an external stimulus.

Examples of external stimulus include:

Light | Temperature | Electricity

Many products today incorporate smart materials, including:

Clothing

Sunglasses

Batteries

Watches

Thermometers

Fun feature

SMART MATERIALS

additional notes

SHAPE MEMORY ALLOYS 1

Shape Memory Alloys (SMAs) are a range of metal alloys that have memory properties. They can return to their original shape after being deformed through changes in temperature or by applying an electrical current.

Uses include:

Glass frames

Aircraft engines

Springs

Piping

Dental & Medical equipment

Fun feature

SMART MATERIALS

additional notes

SHAPE MEMORY ALLOYS 2

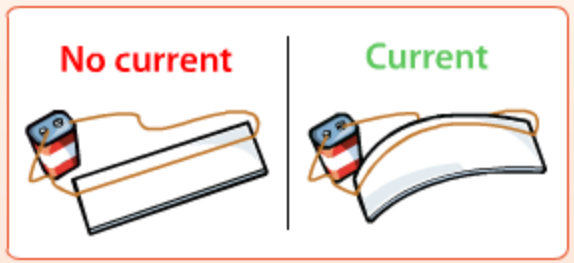
The most common SMA is Nitinol, which is an alloy of nickel and titanium.
As well as returning to its original shape after deformation, it is 10-30 times more elastic that standard metal when just above its transformation temperature.

Nitinol is used in:

Medical equipment | Machinery | Glass frames | Springs | Dental equipment

Smart wire

- **Smart wire** is an **SMA** that shrinks by 5% when an electrical current is passed through it.
- It remembers its original shape.



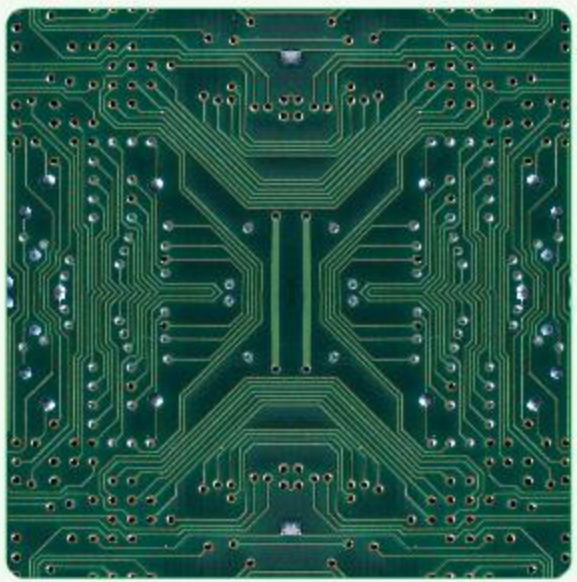
Fun feature

SMART MATERIALS

additional notes

SEMICONDUCTORS

Semiconductors are materials that have electrical resistance.



- As the temperature of semiconductors increases, their resistance decreases.
- Many electrical items such as radios, televisions and telephones contain devices that are made from semi-conductive materials.
- Silicon is the most commonly used semiconductor.
- Single crystals of silicon are cut into thin layers and used as integrated circuits (chips).
- These integrated circuits are then used in devices such as computer central processing units.

SMART MATERIALS

THERMOCHROMIC LIQUID CRYSTAL

Thermochromic Liquid Crystals (TLCs) change colour in response to variations in temperature.

- As the temperature changes, the crystals re-orientate causing the change in colour.
- TLCs can also be made into a special ink that is printed onto plastic to create applications such as thermometers.
- In batteries, thermochromic liquid crystals are printed onto a surface that warms up when a current is passed through it. This provides an indication of how much energy is left within the battery.

Fun feature

SMART MATERIALS

additional notes

PHOSPHORESCENT PIGMENT

Phosphorescent pigments absorb and store energy, leaving an afterglow.

- Light energy is absorbed and slowly released.
- They last 10 times longer than traditional zinc sulphide phosphorescents.
- Available in a range of daylight fluorescent colours.
- Used in glow in the dark products, such as watch hands.

Fun feature

SMART MATERIALS

additional notes

POLYMORPH

Polymorph is a modern flexible polymer that fuses and becomes easily mouldable when heated to 62°.

- Heating is usually performed using water or hot air.
- It can be shaped and reshaped a number of times.
- Polymorph's tough properties make it suitable for a range of demanding applications.
- It is used for prototypes, robotics and plastic shapes.

SMART MATERIALS

SMART MATERIALS RESPOND TO CHANGES in their environment, e.g. changes in temperature and light intensity or movement.

Smart materials also have a 'MEMORY', i.e. they can return to their original state under the right conditions.

Thermochromatic Materials

THERMOCHROMATIC MATERIALS are made of liquid crystals or metal compounds, which respond to changes in temperature by CHANGING COLOUR.

Products include T- shirts, Temptoos, mugs and temperature strips.

Photochromatic Materials

PHOTOCHROMATIC MATERIALS change colour in response to changes in light intensity.

Products include spectacle lenses and 'smart' windows for cars and coaches.

Piezoelectric Materials

PIEZOELECTRIC MATERIALS have two unique related properties:

- when put under stress, e.g. when a mechanical force is used to bend or change their shape, the material produces a voltage
- when a voltage is applied, the material changes shape.

Piezoelectric materials are most widely used as sensors. For example, the airbag sensor in a car is made of a piezoelectric material. The force of an impact on the car triggers an electric charge, which deploys the airbag.

Shape Memory Alloys

SHAPE MEMORY ALLOYS are metal alloys, which 'remember' their original shape. If they are deformed, e.g. bent or dented, they will return to their original shape when heated.

Products include spectacle frames, surgical instruments, dental appliances.

Phosphorescent Materials

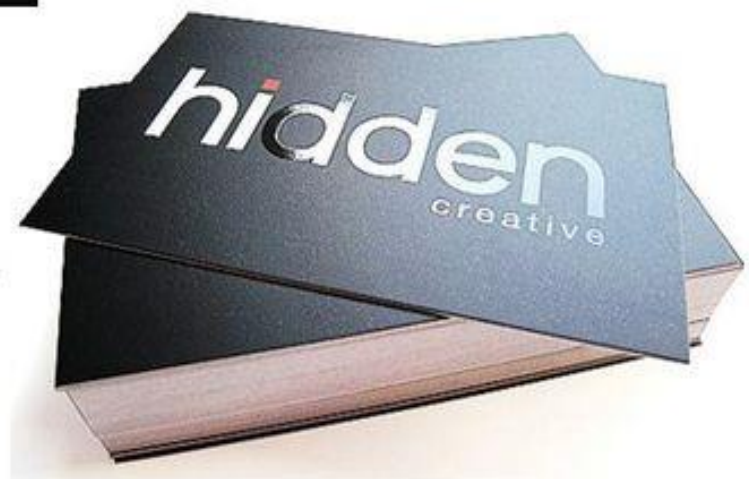
Also known as 'afterglow materials', phosphorescent materials produce visible or invisible light.

Sulphides, which create green, red or blue afterglow, can be added to paints, inks, and moulding or casting materials to produce this effect.

TYPOGRAPHY

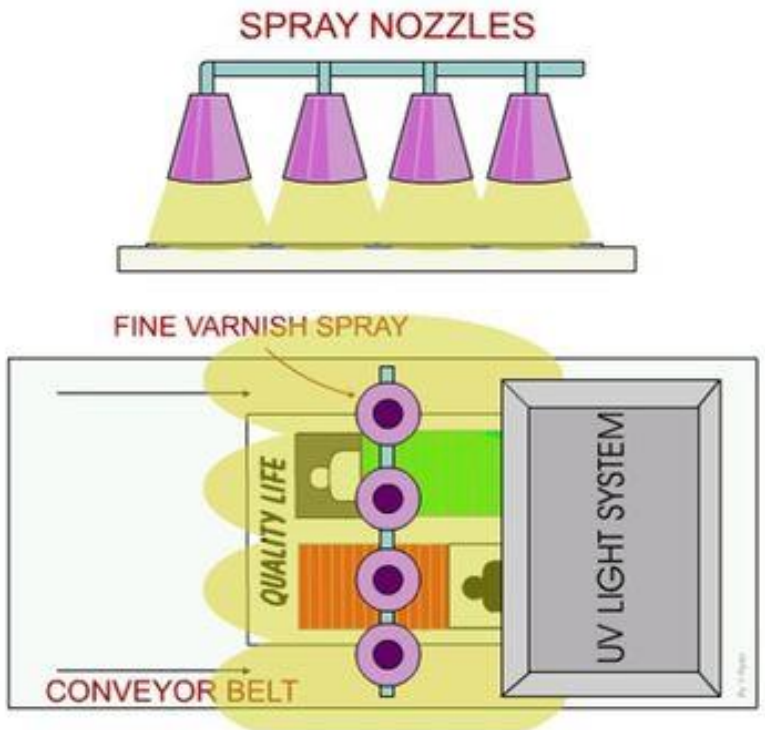
Spot Varnishing

Where only a patch of a packaging, book or card is varnished to create an unusual visual effect.



UV Varnishing

Used to create a glossy effect on packaging and magazine covers



Digital Printing

This includes inkjet and laser printing.

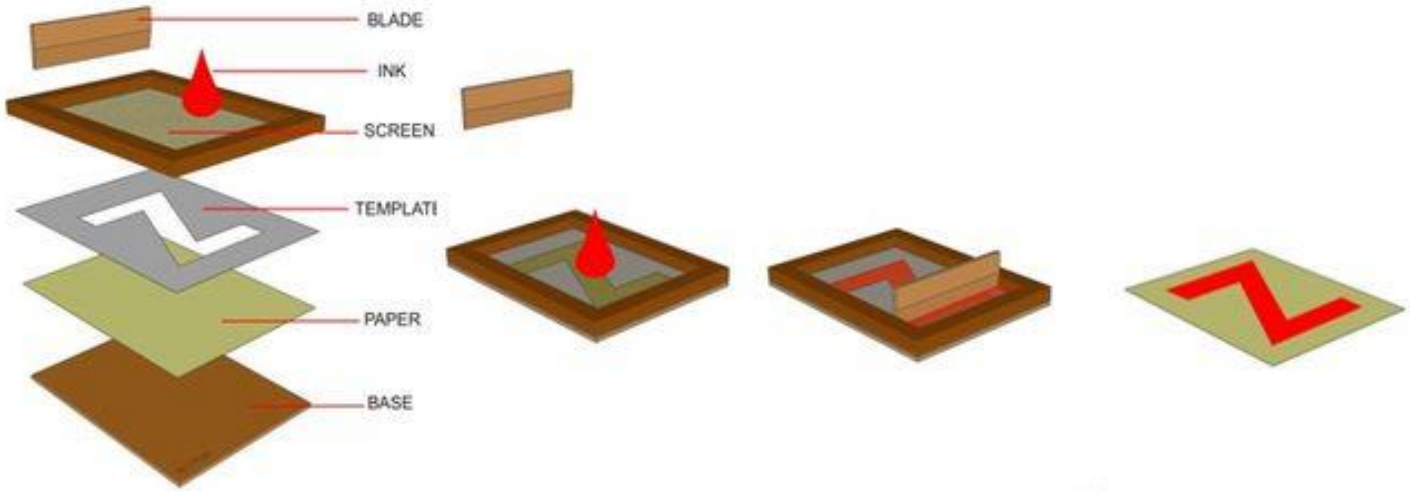
It is used for small print runs and one-offs

It is too slow and too expensive for large print runs.

Used for photograph printing. One-off art and poster prints, documents and presentation boards.

Screen printing

A smaller scale printing process used for shirts and posters. It can use the four process colours or custom colours can be mixed.



Foil application / foil blocking

Where foil is heat pressed onto a packaging, greetings card, book or ticket to give an expensive and luxurious effect.

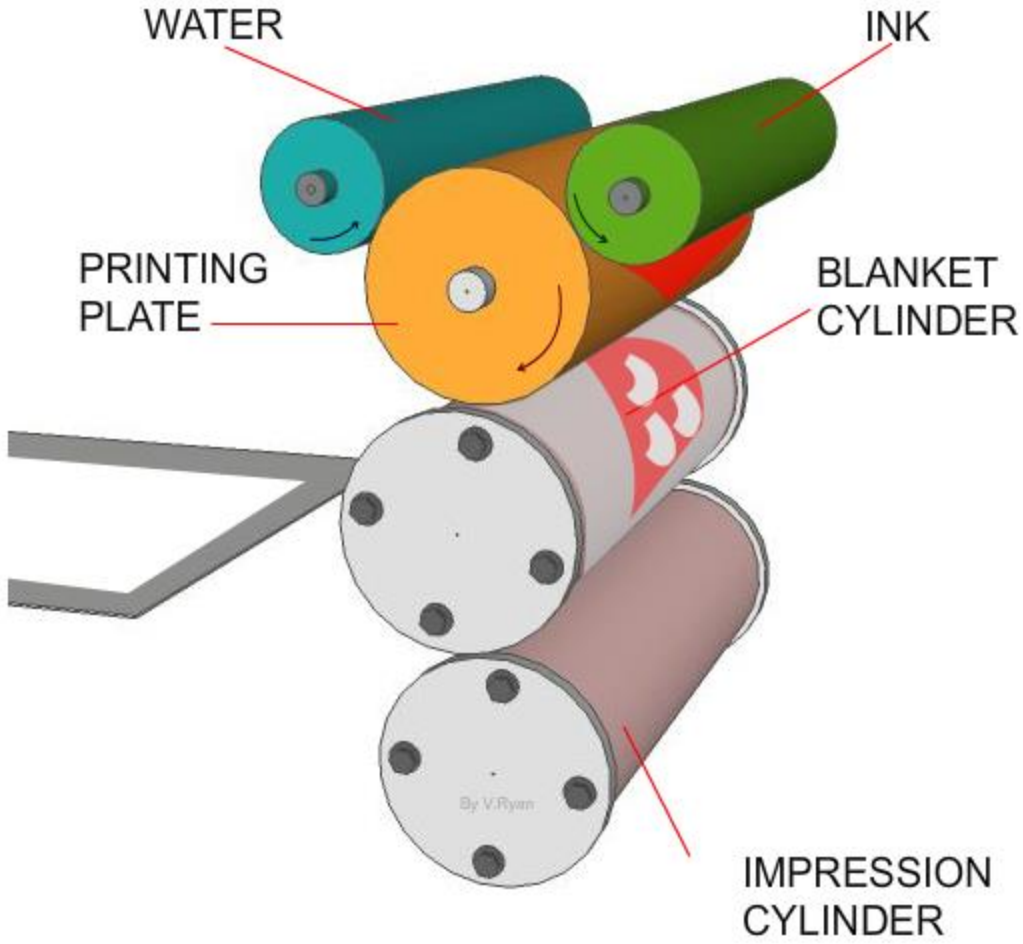
It can also be used to prove the authenticity of certificates and tickets.

Flexography

Flexible lithography for printing thick materials or flexible materials

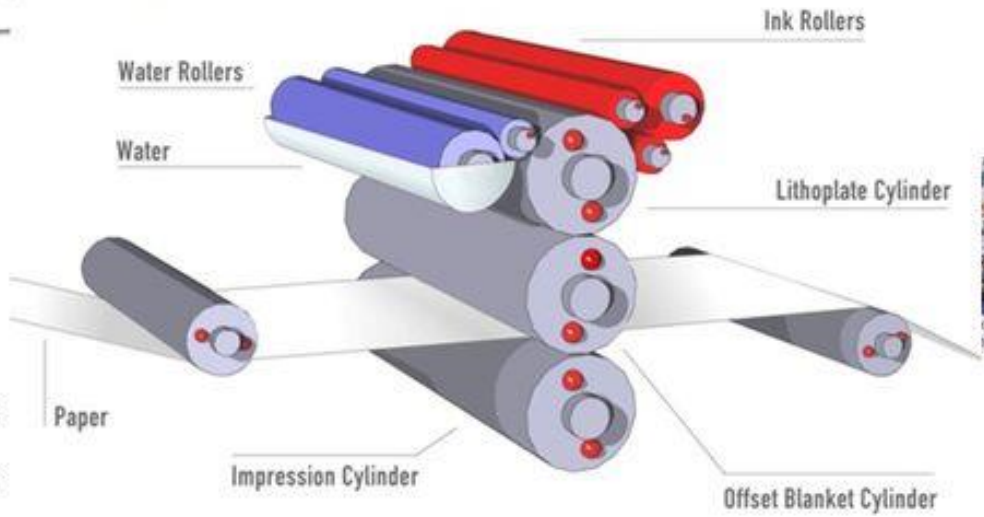
LITHOGRAPHY

Lithography is mainly used by commercial printers, printing companies that will print thousands of copies of the same item, in one production run. Lithography machines can print on both sides of paper/card and they rely on four basic colours; yellow, cyan (type of blue), magenta (type of red) and black. This is also known as the CYMK process.



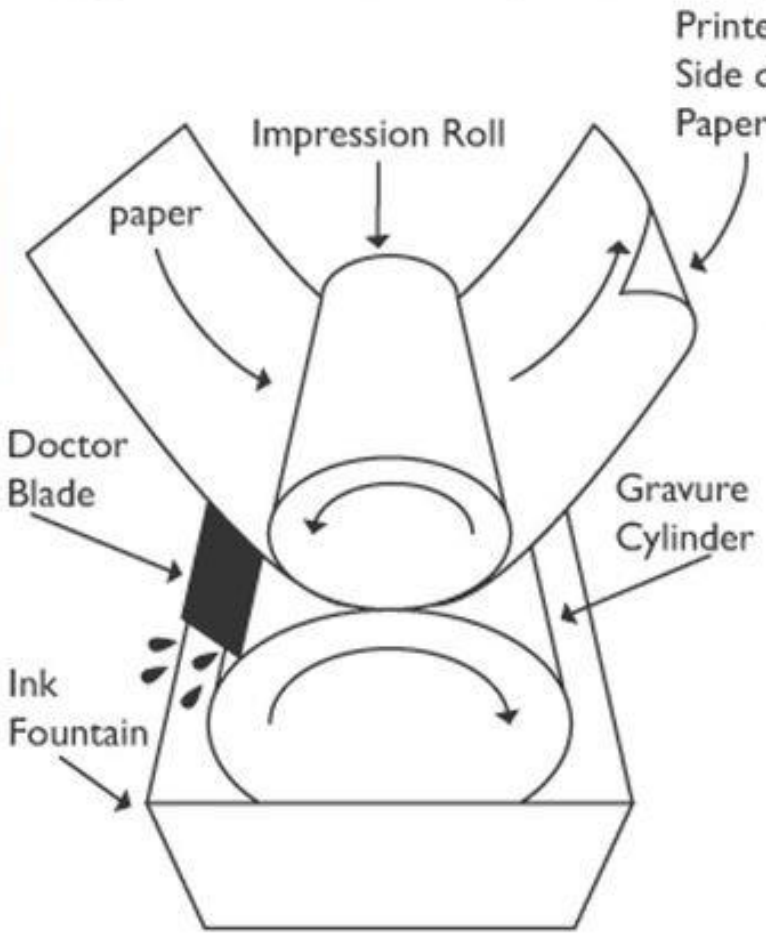
Offset Lithography

A low cost method of printing in very high volume. The most extensively used commercial printing process.



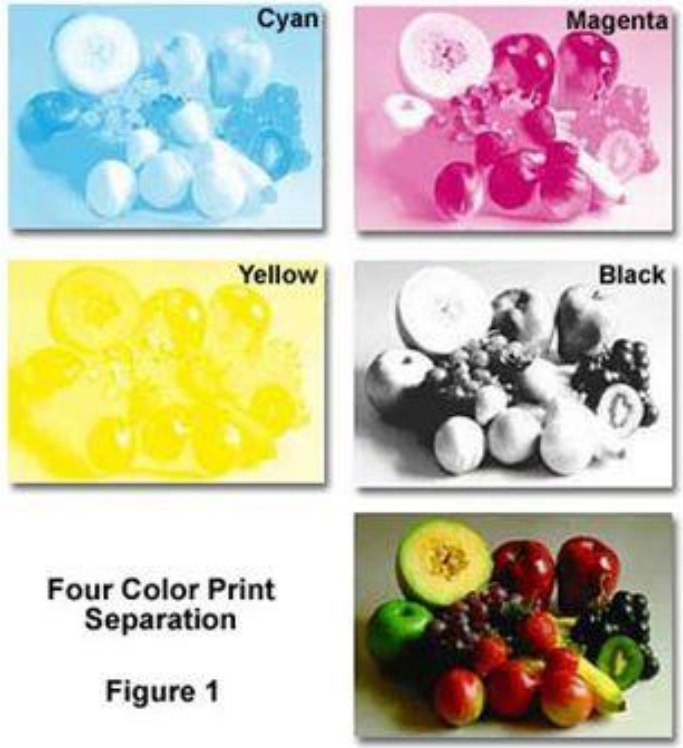
Rotogravure

A high volume printing method used to produce high quality printed images.



The Four Process Colours

These four colours are used in all standard printing methods. They can be mixed to create any colour.



Four Color Print Separation

Figure 1

Colour Separation

When an image is printed, it is first separated into the four process colours. This is called colour separation.

Sustainability and environmental issues

All products that we use have some impact upon the environment. The materials they are made from have to be extracted, transported, processed and manufactured. The products are transported to the consumer and need to be maintained.

New laws being introduced all the time, make designers and manufacturers increasingly consider the environment. Consumers are now becoming much more aware of the choices that need to be made when choosing a product.

Products that can be reused: one choice for the consumer is whether or not to buy a product that can be reused, or only products that can be used once. A plastic milk bottle is used once and disposed of, however a glass milk bottle can be reused several times.

SUSTAINABILITY

Products that can be replaced: some products are designed so that only parts of them need to be replaced, this avoids having to replace the whole product. To improve the sustainability of a product, designers should look to decrease the number of parts to be disposed of.

Examples of these may include shaving razors.

Other Sustainability issues

The designer, manufacturer and consumer all need to consider

the environmental impact of materials used and the processing of those

materials to make a product.:

- Are materials made from a sustainable source?
- Are huge amounts of energy needed to process materials, and transport them to the consumer?
- What happens to the material s used for the product at the end of its life cycle?

SUSTAINABILITY

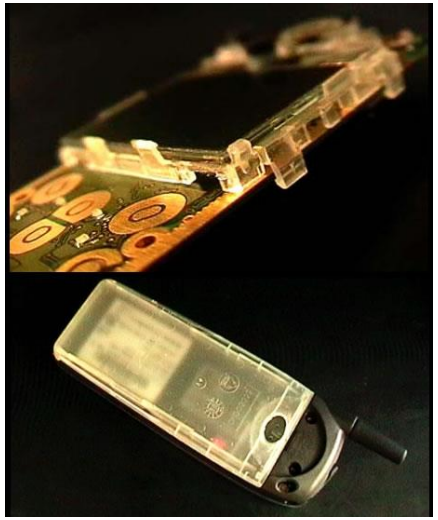
Making products easier to recycle

Smart materials can be used to make products easier to take apart at the end of their lives. Shape memory polymers and shape memory alloys are material s that can be designed to change shape at specific temperatures. By replacing screws, rivets and clips with fastenings made from smart materials, a product can be designed to fall apart, with different materials releasing at specific temperatures. This process is **active disassembly.**

Making new products from recycled materials

When products are recycled at the end of their lives, it often produces a brand new material. Designers and manufacturers have to work together to invent new uses for these new materials. *Examples of this may include:*

- *Plastic bottles being used to make clothing. (fleeces)*
- *Old car tyres ground up and re-bonded to make flooring for children's outdoor playgrounds.*



SUSTAINABILITY

The 6Rs

Six key words summarize approaches that can be taken by the consumer, designer, manufacture, and retailer – the 6 Rs:

Reduce, Recycle, Reuse, Refuse, Rethink, Repair.

Reduce – consumers need to look to reduce the umber of products they buy, or consider buying products that use less energy. Retailers can reduce carbon emissions by transporting products straight to the consumer.

Recycle – products are converted back to their basic materials and remade into new products, product examples may include paper, cardboard, packaging, steel, aluminum cans, plastic bottles, glass bottles and jars.

Reuse – glass milk bottles are an example of a material or product that can be reused, as are printer ink cartridges.

Refuse – the consumer has a choice as to whether buy the product or not.

Rethink – do consumers really need the product? Can things be manufactured differently?

Repair – designers have the responsibility to make products that can be repaired more easily.

SUSTAINABILITY

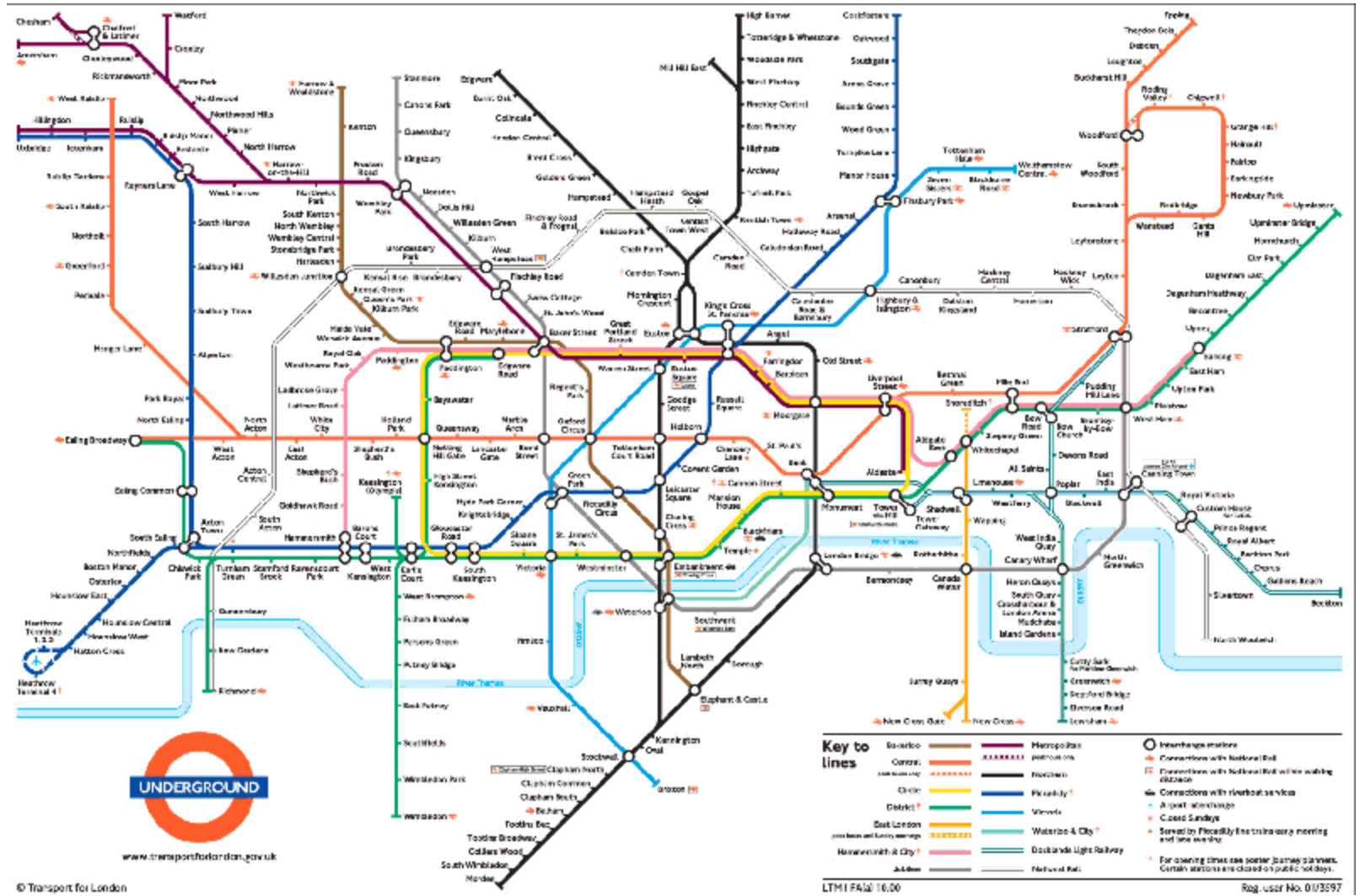
HARRY BECK

Harry beck designed the London underground map in 1933. Despite this being a very familiar image now , back in 1933 it was a very new concept/format for presenting geographical maps.

The map itself is not to scale but the data allows people to locate the position they are in, and where they are going to be next.

Becks inspiration was taken from electrical wire diagrams.

On the map different colours indicate the different underground lines, and standard symbols represent interchanges and stations.


UNDERGROUND
www.transportforlondon.gov.uk
© Transport for London
Key to lines
Bakerloo
Central
Circle
District
East London
Hammersmith & City
Jubilee
Metropolitan
Northern
Piccadilly
Victoria
Waterloo & City
Docklands Light Railway
National Rail
Interchange stations
Connections with National Rail
Connections with National Rail not for walking distance
Connections with riverboat services
Closed Sundays
Served by Piccadilly line trains every morning and late evening
For opening times see station journey planners. Certain stations are closed on public holidays.
LTM1 FA(a) 10.00
Reg. user No. 01/3697

PRACTICE

Draw a bus route with which you are familiar, in the style of Harry Becks London Underground map.

10 Mins

ALBERTO ALESSI - MANUFACTURER

Albert Alessi is Italian, and trained as a lawyer. He joined his family company making metal kitchenware for the hotel and catering trades.

He wanted to combine creativity, mass production, good design and craftsmanship to make well-designed products available for everyone.

Alessi did not design products himself but his design philosophy that started many new debates and brought about fresh ideas.

His company developed a reputation for superior designed products. His designs are not simply based on function, cheaper alternatives of most Alessi products are available however, as basic everyday items on the market, but Alessi designs will sell for more money because of the design.

Philippe Starck
Lemon Squeezer

Alessandro Mendini
Corkscrews

JOCK KINNEAR & MARGARET CALVERT

Jock Kinnear & Margaret Calvert are both graphic designers.

In the late 1950's road signs that we see today were not standard. As more people started to drive signs were needed to help motorists understand the roads.

It was important that all people could understand the road signs and could see them clearly, without them being too distracting.

Jock Kinnear and Margaret Calvert developed a typeface that was clear and easy to read when driving which they called transport.

They adopted the european idea of using pictograms instead of words to warn driver of hazards. Margaret Calvert took inspiration from childhood photos to create the warning signs.

They are also responsible for the variation in colours used for different types of road signs, white letters on blue for motorways, yellow letters on green for primary roads and black on white for secondary roads.


15%


MOTORWAY SIGNS
Motorway M10 (M1)
Flag type route to motorway sign
Motorway M4
Rectangular type route to motorway sign
Birmingham M1
Direction sign to motorway at junction with motorway
Fog Warning
Motorway
NO L-drivers or Motorcycles under 50 cc Mopeds, Pedal-cycles Invalid-carriages Pedestrians, Animals
To indicate traffic excluded from a motorway
Forton Services ½ m
P
Distance to named service area at which fuel, parking, cafeteria and restaurant facilities are available
Permitted variant: The name of the area and the symbol or symbols relating to facilities which are not available may be omitted
A 52
1m
Route number of road extending from a junction 1 mile ahead
M1
Sheffield 32
(Doncaster 47)
Leeds 59
Route number of motorway with names of and distances in miles to places of traffic importance to which it leads. The bracketed name and figures indicate a place which can be reached by a road which branches off the motorway and the distance in miles to that place
Preston
Blackpool
A 59
Lancaster
M6
Wigan
Manchester
M6
Map type advance direction sign on primary route for a complex motorway junction
M10 Barnet & Hatfield
London & Watford M1
Route numbers of motorways extending from a junction ahead, places to which they lead and appropriate traffic lanes for traffic to those places
250 yds
Direction and distance to public telephone
Birmingham M45
Rugby Leicester M1
Route numbers of motorways and places to which each leads from a junction of two motorways
Stretford
B 5213
Altrincham
M62
Stack type advance direction sign on non-primary route for a junction with a motorway
To indicate distance in hundreds of yards to the next point at which a driver may leave a primary route or a motorway
End of motorway 1 mile
Works unit only
M.O.T. signs by permission

PRACTICE

Design a set of signs for departments to display in corridors at school. Include pictograms of the subjects in the style of Kinnear and Calvert

10 Mins

Pictograms – a 2D block-coloured picture that conveys a meaning or warning.

WALLY OLINS

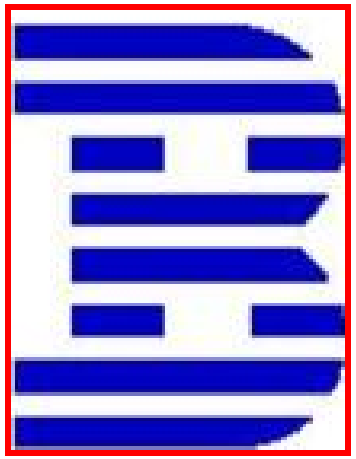
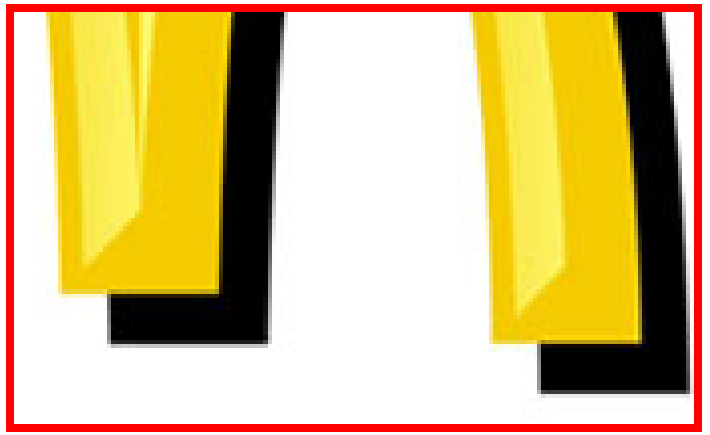
Companies use graphic design to help promote their business, products and help to create brands and help top establish how well they are recognised to customers.

A brand will have a visual identity such as a logo, but branding is also about the relationship the customer has with the product. (corporate image) They may use a simple phrase, initials, a logo, or a combination of these.

Wally Olins is a brand consultant, together with a man called Michael Wolff, together they founded an advertising agency call ‘Wolff Olins’ which has since become a major influence in developing corporate images in the UK and Europe.

Olins has worked with companies such as P&O and BT

Olins now works with charities, governments and even countries to help them not only to have a corporate image but also to develop identity.




T&N


PRACTICE

Design a brand identity for yourself to help people get to know or understand you as a person.

10 Mins

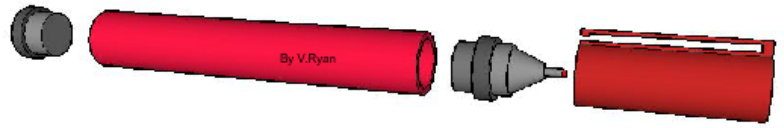
Branding – a logo or image associated by the public with a product.

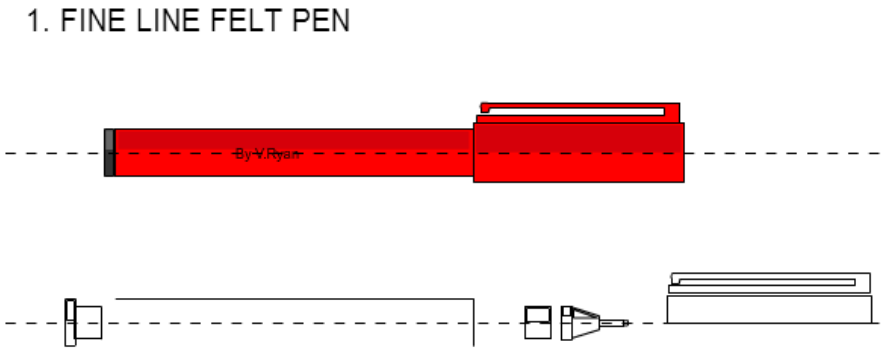
Corporate image – The branding of a company.

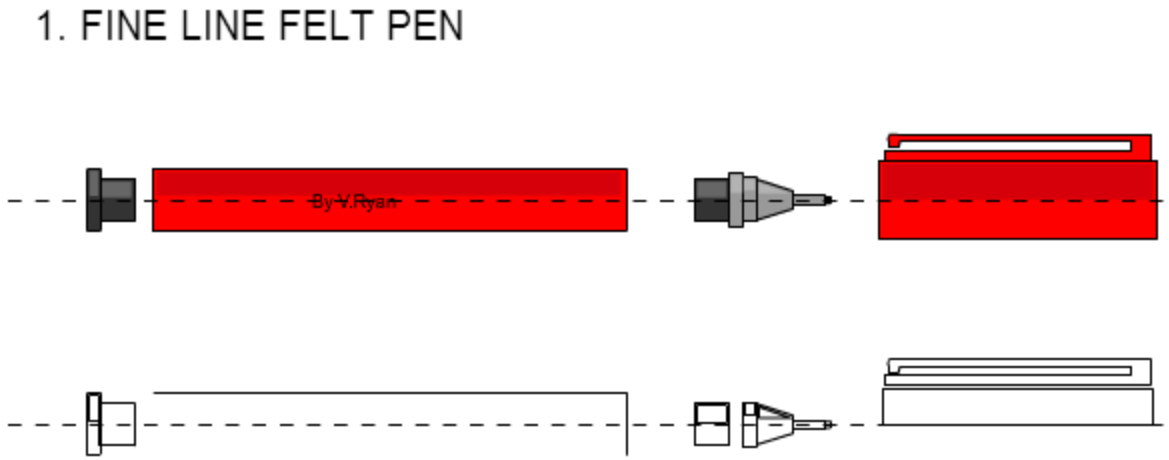
Corporate identity- The qualities and values and organisation wishes to be associated with and recognised by.

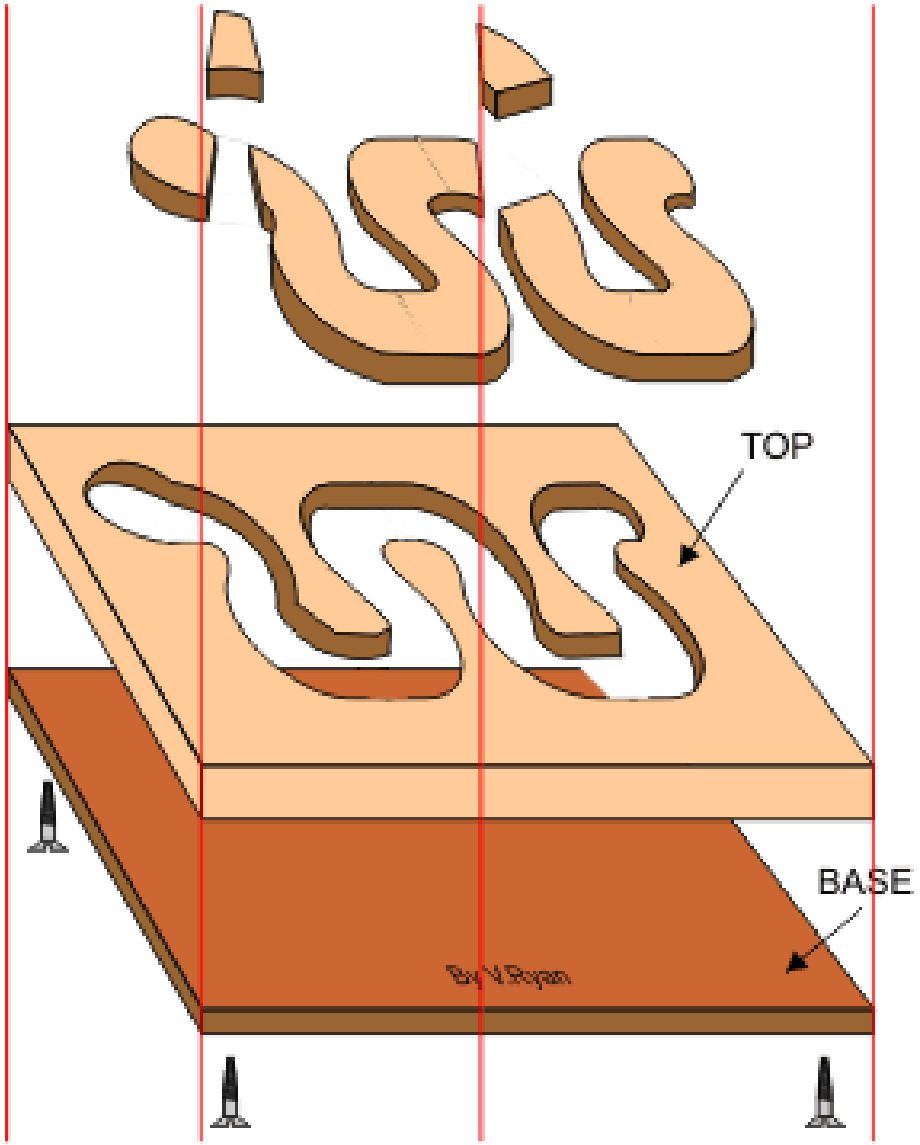
EXPLODED DRAWINGS

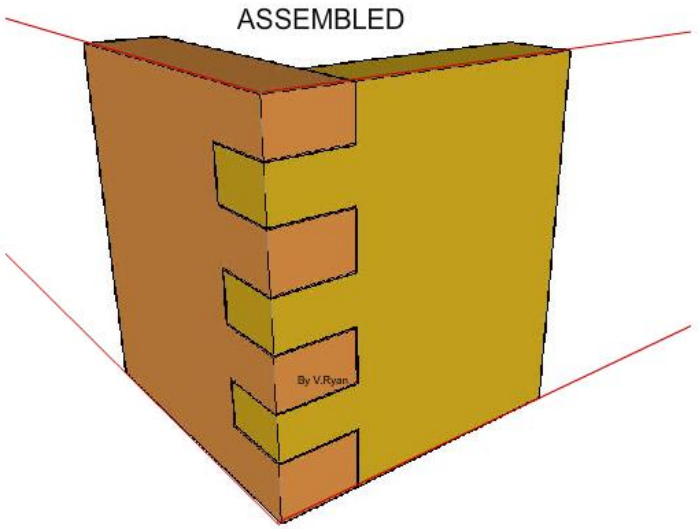
Exploded views are often a good way of showing detail. The drawings below show two types of similar pens. One is a fine line felt pen used for drawing precise, fine lines. The other is a fountain pen and it is used to write letters etc.... Both pens have been drawn as ‘exploded views/drawings’. In an exploded drawing the pens are drawn with all their parts disassembled (taken apart). It is important to recognise that all the parts are in line with each other, drawn usually along a centre line which is drawn through the centre of the design.

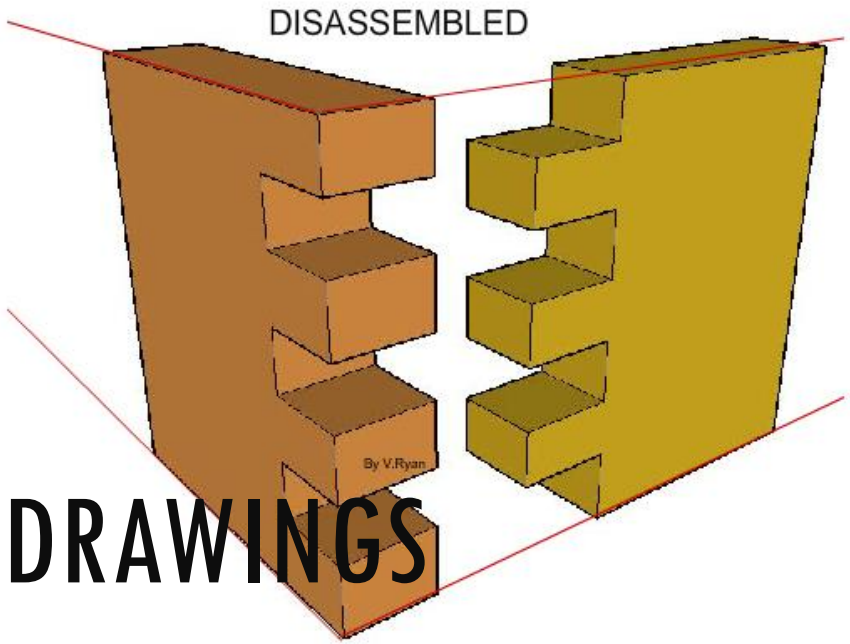












EXPLODED DRAWINGS