



Woldgate School

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Wonder
Learning Partnership
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Knowledge Book 2024-25

Name:

Form:

YEAR

10

ART & DESIGN KNOWLEDGE ORGANISER (KO) PERSONAL CHOICE PROJECT

The Formal Elements
In Art and Design

LINE

TO NE

SHAPE & FORM

COLOUR

TEXTURE

PATTERN

Challenge Task:

Make sure that you include some of your own photographs (primary source photos) in Personal Choice Project 2

Key Words

Primary Source

This is when a piece of work is produced after drawing or photographing something first hand ie your own photographs.

Secondary Source

This is a piece of work that was created later by someone who did not experience the event first-hand. ie internet photographs

Observation drawings

Drawing from objects first hand
Tone

The lightness or darkness of something. Tone or shading can help 2D shapes look 3D

Composition

The way in which something is arranged or placed.

Critical Review/Annotations

This written work expresses your opinion on whether something has work well or badly. Comment on your work as it progresses.

Needed in Artist Research:

ARTIST NAME

IMAGES OF ARTISTS WORK

BE SELECTIVE AND MAKE SURE THE IMAGES ARE GOOD QUALITY

ANALYSIS OF ARTIST WORK – SEE ANALYSIS QUESTIONS

YOUR OPINION – HOW ARE YOU GOING TO DEVELOP THIS INTO YOUR WORK?



PERSONAL CHOICE PROJECT 2 MOODBOARDS AND RESOURCES

It is important to show evidence of lots of research that you have done based on your choice of topic. This shows you have imagination, ambition and creativity. Photos are important (primary and secondary) as well as other images that might be useful to you such as from magazines or leaflets from visits.

ARTIST RESEARCH X2

Research at least 2 artists that are relevant to your project.

1. DESCRIBE WHAT YOU SEE?

2. WHAT DO YOU THINK THE ARTIST IS INSPIRED BY?

3. WHAT MATERIALS & TECHNIQUES DO YOU THINK THE ARTIST HAS USED?

4. WHAT DO YOU LIKE ABOUT THE ARTISTS WORK?

5. CRITICALLY REVIEW WHAT WORKS WELL?

6. COMPARE & CONTRAST MULTIPLE ARTIST PIECES

7. PERSONAL RESPONSE
HOW ARE YOU TAKING INSPIRATION FROM ARTIST WORK?

8. GIVE YOUR OPINION ABOUT THE ARTISTS WORK

DRAWINGS FROM MOODBOARD PICTURES

Use a variety of materials, techniques and processes. This will show off a wide variety of skills. Use black and white (B/W) as well as colour.



2

Select your theme:

PORTRAITS

INTEGRATE

PLACES & SPACES

CURVED & STRAIGHT

FRAGMENTS

IMAGE & WORD

You will be producing the following:

Title page

Moodboard/images

Artist Research X 2

Drawings – B/W

Drawings – Colour

Digital Manipulations and development drawings

Work in the style of artist 1

Work in the style of artist 2

Planning for final piece

Sampling for final piece

Mock-up of final piece

Final piece

Developed Final piece





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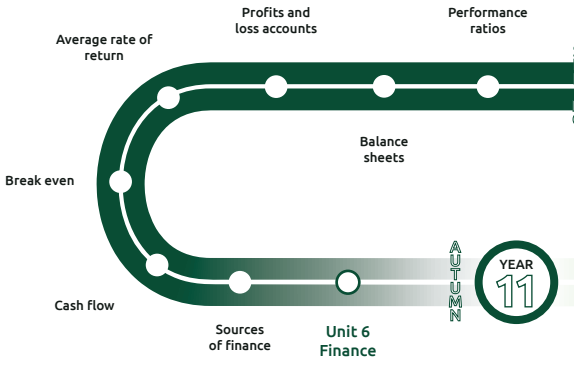
GCSE EXAMINATIONS

Revision and Exam Preparation

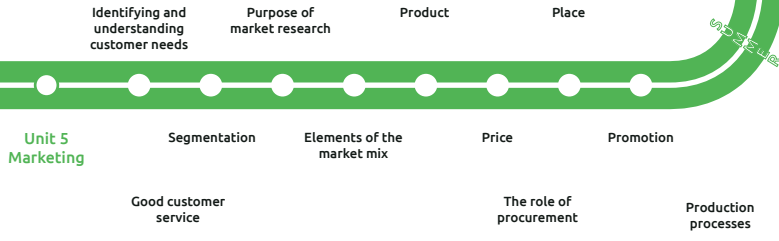
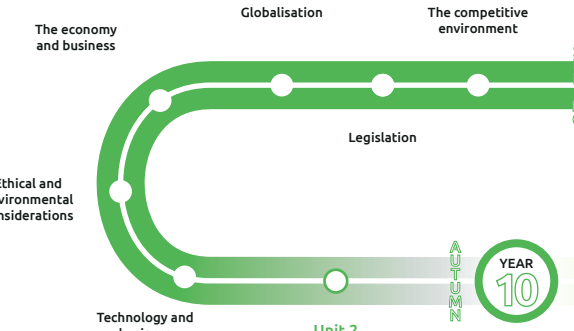
Paper 1 – Influences of operations and HRM on business activity

Paper 2 – Influences of marketing and finance on business activity

Revision and exam preparation



Examination preparation and revision for mocks



GCSE BUSINESS



3.5.1 / 2 - Identifying & understanding customers & Segmentation

A **Market** consists of all the sales of one particular group of goods or services. For example, the grocery market, the housing market, or the stock market.

In every market, businesses must identify and satisfy customer needs. This is the purpose of **Marketing**. All businesses work hard to identify and satisfy customers needs in order to:

- Provide a product or service that customers will buy
- Select the correct **Marketing Mix**
- Avoid costly mistakes
- Be competitive and increase sales

$$\text{Market Growth} = \frac{\text{change in market size}}{\text{original market size}} \times 100$$



The same way we would break up an orange, we **segment** a market.

Segmentation allows businesses to focus on individual groups, such as gender, age groups, geographic location, levels of income.

Businesses will **target segments** where it thinks:

- ✓ It can be profitable
- ✓ It can compete effectively
- ✓ It covers the opportunity costs

By doing this, we can better understand the different groups of consumers we might be targeting. That way we can design products, pricing, advertising, and ways of delivering the product, that suit each group.

Benefits of accurate segmentation	Drawbacks of segmenting / risks of doing it badly
Businesses design better products, advertising, and prices, and promotions, which lead to more sales.	Detailed research will be required – this can be expensive
Understanding our customer better, we can predict what they may want in the future.	It can be very difficult to accurately predict what a customer will like or dislike
We can maximise the profit from each group – for example, knowing that some people have no choice but to use the train at a set time, means we could charge a higher price.	All of our competitors will be trying to do the same thing, meaning that if we don't do it well they will be able to gain a significant advantage over us.

3.5.3 - The purpose and methods of market research

Market Research is the process of a business collecting information that will help it to better compete with its opposition. It enables a business to gain a better insight into the market and its conditions and then are in a better position to make decisions.

Purposes of Market Research – businesses collect information about:

Demand	Competition	Target Market
How much/which products do consumers want/need? What features should their product have and what price should they set?	How are the competitors in the market operating? How are they different to us, and how are they innovating?	Who are our customers? What specific wants/needs to they have? Can we improve how we deal with them to increase sales?

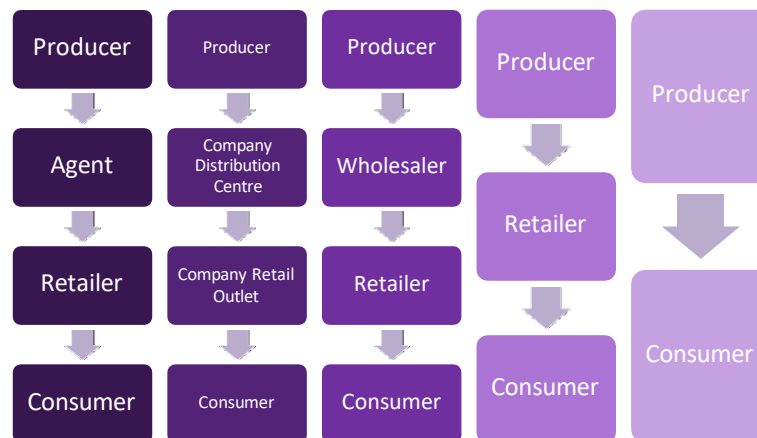
Primary	Secondary	Quantitative	Qualitative
Research I design and conduct specifically for my business	Research someone else has designed and conducted	Data that is numerical / can be counted	Information that is descriptive and cannot be easily counted

Method	Advantages	Disadvantages
Questionnaires & Surveys	Easy / cheap to produce	Difficult to get responses May be leading questions
Interview	Detailed information as more time to ask further questions	Time consuming and so expensive
Focus Group	Opportunity for discussion More detailed responses	Time consuming Groups may not be representative
Internet Research & Printed Media	Lots of information available Cheap (Secondary Research)	Information can be misleading Others designed the research / may not be suited to your purpose

$$\text{Market share} = \frac{\text{sales of a product}}{\text{total market sales}} \times 100$$

3.5.4 - The Marketing Mix: Place

Place refers to the different channels of distribution a business uses to get their products to the customers.



In each of the possible scenarios show above, the seller might choose a range of ways to sell to the buyer:

- Traditional – via a shop / office
- Modern retail – using technology to improve the process (i.e. self-scan/checkout)
- Telesales – sales made by phone direct to the customer
- E-commerce / M-Commerce – sales via a website or app
- Mail-order – produce catalogues and customers order from them

Choosing the right method of getting the product to the customer is vital.

AQA GCSE Business

Marketing

Unit 5

Appears in:
Paper 2



3.5.4 - The Marketing Mix: Promotion

Promotion is the name given to all of the business activities that encourage the customer to buy a product.

Why we promote	How we choose a method
It's important to promote a product, especially when it's new or if it is in a market where there's lots of competition. It's used to: <ul style="list-style-type: none"> - Inform/remind customers about the product - Create or increase sales - Create or change the image of the product - Persuade customers to buy or try the product 	What a businesses chooses to do to promote their product is influenced by both internal and external factors: <ul style="list-style-type: none"> - Finance available to spend - What the competitors in the market are doing - The type of good or service the product is - The nature of the market and how competitive it is - Who the target market are

Advertising	PR	Sales	Sponsorship	Social Media
These are the types of adverts you would be familiar with on TV, Radio, in newspapers, on the internet and on billboards	Public Relations events and activities are the ones that change how we think about a business. For example, some give to charity.	Promotion Special offers and displays. 2 for 1 and BOGOF, free gifts, coupons, samples, competitions.	Businesses often sponsor football teams or sporting events. The same as they might sponsor a good cause such as a school.	Interacting with customers via social media is increasingly important to modern business. It involves the customer in the brand.

3.5.4 - The Marketing Mix: Price

Businesses set prices for their products based on a range of **internal** and **external** factors.

- ✓ Costs associated with the product e.g. fixed / variable costs
- ✓ Demand e.g. what are people willing and able to pay.
- ✓ Nature of the market e.g. competitive (rivals)
- ✓ A business's objective and approach to pricing
- ✓ The stage a product is at in its product life cycle e.g. growth phase – higher price
- ✓ Rest of the marketing mix e.g. price must fit with the other elements of the 4 p's.



Skimming	Description: Setting a higher price when a product is released Potential Impact: The company can try to take advantage of excitement around the release of the product – with customers willing to pay more to get the product sooner the company can recover some of its Research and Development costs e.g. new iPhone
Penetration	Description: Setting a price lower than the competition for a short time Potential Impact: By pricing below the competition a company can attempt to increase their share of the market. If their product is new, or if they are entering this market for the first time, it could encourage customers to try the product or switch from a competing product. E.g. Netflix
Competitive	Description: Pricing alongside or similarly to the competition Potential Impact: By pricing alongside our rivals, customers will see our price as the "going- rate" – the normal price. We shouldn't be seen as expensive, and so customers are less likely to go elsewhere simply because of the price. E.g. petrol / diesel
Loss Leader	Description: Setting a price for a product that means a loss is made on each sale Potential Impact: A very low price on a product may encourage people to visit the shop, and subsequently buy other items that do make a profit. E.g. printers cheap, ink cartridges higher price
Cost-Plus	Description: Adding a percentage profit to the cost of producing/selling a product Potential Impact: Provided we sell enough units for us to cover our fixed costs, each unit sold should make a profit. Set the price so that each sale covers its own variable costs.

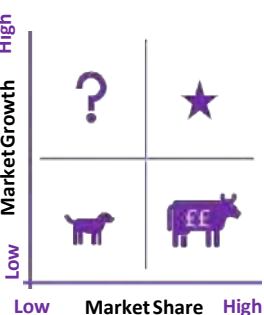
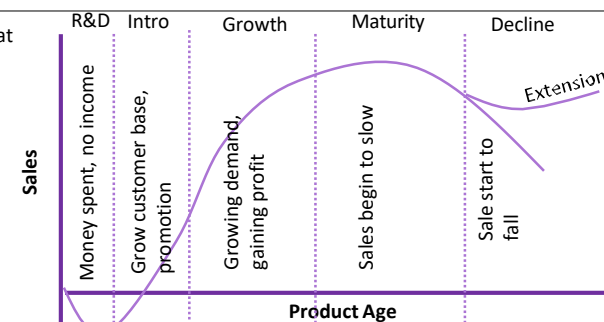
3.5.4 - The Marketing Mix: Product

Deciding which products to offer is a marketing activity. There are risks and benefits of releasing new products and discontinuing old ones. Which products are sold and their quality, will affect **brand image**.

Having a **unique selling point** can improve sales in competitive markets.

The **Product Lifecycle** shows the stages that a product is likely to go through during its lifetime. It also shows how decline is not inevitable, and that **extension strategies** could be used to avoid the decline phase.

- Extension strategies include:
- ✓ Update the packaging
 - ✓ Target new customers
 - ✓ Add more features
 - ✓ Spend more on advertising
 - ✓ Cutting the price
 - ✓ Trying to encourage more purchases on more occasions



Question marks
Market is growing fast, need to spend money on promotion, cant guarantee success.

Stars
Market is fast growth, keep improving them to turn them into cash cows.

Dogs
Products are not much use, either get rid or try to improve them.

Cash cows
Well known products, can gather revenue with little promotional expense now.

The **Boston Matrix** is a tool for analysing a product's share and growth in the market. A **product portfolio** is the collection of products that a firm produces.

Where a product appears in the matrix might help us to decide what to do next to improve our profitability.

Businesses want a balanced portfolio of products e.g. Cash cows help finance question marks/stars.

Key Term	Definition
Advertising	Communicating with the customer to inform them about / convince them to buy a product
Boston Matrix	A way of analysing a product's share and growth in the market
Brand Image	How the brand is seen by the customer, their perception of its strengths, weaknesses, personality. It changes over time and all of the customers' interactions with the brand will inform it.
Cash cow (Boston matrix)	Product has a high market share in a low growth market
Competitive Pricing	Setting a price to be in line with a competitors' price for the same or similar products.
Complementary Product	A product that is sold alongside another that may be of use or interest to a customer. For example, extended warranties alongside the checkouts at CurrysPCWorld.
Cost-Plus Pricing	Adding a percentage to the cost of producing a product so that a profit is made.
Customer Engagement	How the business tries to build a relationship with the customer in order to build loyalty.
Direct Marketing	Occurs when there is a direct link from the producer to the customer with no intermediaries
Distribution Channels	How the ownership of a product passes from the producer to the final customer
Dog (Boston matrix)	a product that has a low market share in a low growth market
EPOS	Electronic Point of Sale. A till / checkout that will automatically update stock / print coupons and vouchers etc.
Extension Strategies	Methods that extend the lifecycle of a product. Such as, updated packaging, adding new or different features, changing target market, special offers, advertising, and price reduction.
Focus Group	A group of people chosen from the target market to discuss a product. Provides the business with qualitative data relating to their opinions.
Intermediary	Is a link in the distribution chain between the producer and the customer
Loss Leader pricing	A product sold for less than it costs in order to encourage more customers to buy other items.
Market Research	Process of gathering, analysing and processing data relevant to marketing decisions.
Marketing	The activities within a business that combine to ensure the customer gets what they want, in the quantities they want, at a price they are willing to pay.
Marketing Mix	The four areas of marketing, and how a company uses them in combination to meet the needs and wants of customer while maximising sales, revenue and profit.
Market segment	A group of buyers with similar needs within the overall market

Key Term	Definition
Penetration Pricing	Launching a new product at a low price to achieve fast sales.
Point of Sale	The place in a store, or webshop that the customer buys the product. Often an opportunity to attempt to sell complementary products.
PR – Public Relations	The act of managing the relationships between the business and wider groups. For example, environmental groups, pressure groups or investors. All with the aim of improving brand image.
Price skimming	Setting a high price for a product when it first enters the market
Primary Research	Designing your own research, then collecting the information first-hand. Also called field research.
Product Differentiation	Developing features within a product that set it apart from other products in the same market. Using these differences to help promote the product and convince customers.
Product Lifecycle	The stages a product goes through from initial idea to removal. Research and Development > Introduction > Growth > Maturity > Decline (Extension).
Product Portfolio	The collection of products that a firm produces
Promotion	Communicating with customers in order to inform / remind them about a product or persuade them to buy.
Qualitative Market Research	Collecting information about customers' thoughts/opinions about a product – customers are able to explain in detail.
Quantitative Market Research	Collecting information in a numerical manner – less detail is possible, but statistical analysis is easier.
Question mark (Boston matrix)	A product has a low market share in a fast growth market
Retailers	A shop that sell direct to the customer
Sales Value	Measures the revenue generated from sales.
Sales Volume	Measures the number of items sold.
Secondary Research	Using sources of information that have already been collected / published. Also called 'desk research.'
Segmentation	Dividing a market into groups that can be more easily targeted with specific products / adverts / prices. It enables the business to meet the needs and wants of a specific group more easily.
Star (Boston matrix)	A product has a high market share in a fast growth market
Telesales	Attempting to sell products by phone.
Unique Selling Point (USP)	The main benefit / key feature of a product that differentiates it from the other products in the same market.
Wholesaler	A business that sells in large quantities, usually buying them from manufacturers, then selling to retailers.



GCSE EXAMINATIONS

2 GCSE Exam Papers

Revision

Search with SQL

Purpose and functionality of systems software

Programming languages

Functions of the OS

Files, fields and attributes

Sort with SQL

Operating systems

Translators and facilities of languages

Utility system software

Structured Query Language

Logic

RAM and ROM

CPU components and their functions

CPU

YEAR 11

Structured data

Truth tables

Types of storage and their suitability

Storage and memory

Hardware

Data mine

Sorting algorithms

Networks

Hardware

Transmission methods

Protocol stack

VPN

Library code

Searching algorithms

Trace tables

Types of networks, PAN, LAN, WAN

Protocols

Addressing

WiFi

Algorithms

Compression

Using Binary data

Use of data types

Data

Ascii Art

Using Hexadecimal data

Analog

Converting between number bases

Data types

Negative numbers in computing

Hex

Algorithms

Producing algorithms

Chat app

Lists

Maths for Computer Science

Computational thinking

Story game

Types of error

Quiz host

Pixels, resolution and colour depth

Digital images

Number bases – decimal binary and hexadecimal

Analysing data

The investigative cycle

Using software to visualise data sets

Sound editing

Image editing

Representations going audiovisual

Layers of computing systems

Hardware

Operating systems

Artificial Intelligence

Introduction to Python programming

Using assignment statements

Using binary selection

Boolean variables

Locating and correcting syntax errors

Operations on strings

Using variables to track counts and sums

Using data

Collecting data

Modelling data using spreadsheets

Using block based programming

Mobile apps

Modifying markup

Working with multiple objects

YEAR 8

Making calculations on a spreadsheet

Spreadsheets

Developing an app

GUI elements

Programming using scratch

Paths

Manipulating shape

Media vector graphics

Credibility of sources

Networks

Wired and wireless networks

Programming using scratch

Sequence and variables

Iteration

Website building blocks

Searching the web

Word processing

Promoting a cause

Networking hardware

The internet

Programming essentials

Operators

Developing for the web

Shortcuts

Navigating the web

Using Media to gain support for a cause

Branding

Digital Media

YEAR 7

Presenting

Adding content

Getting the message across

COMPUTING

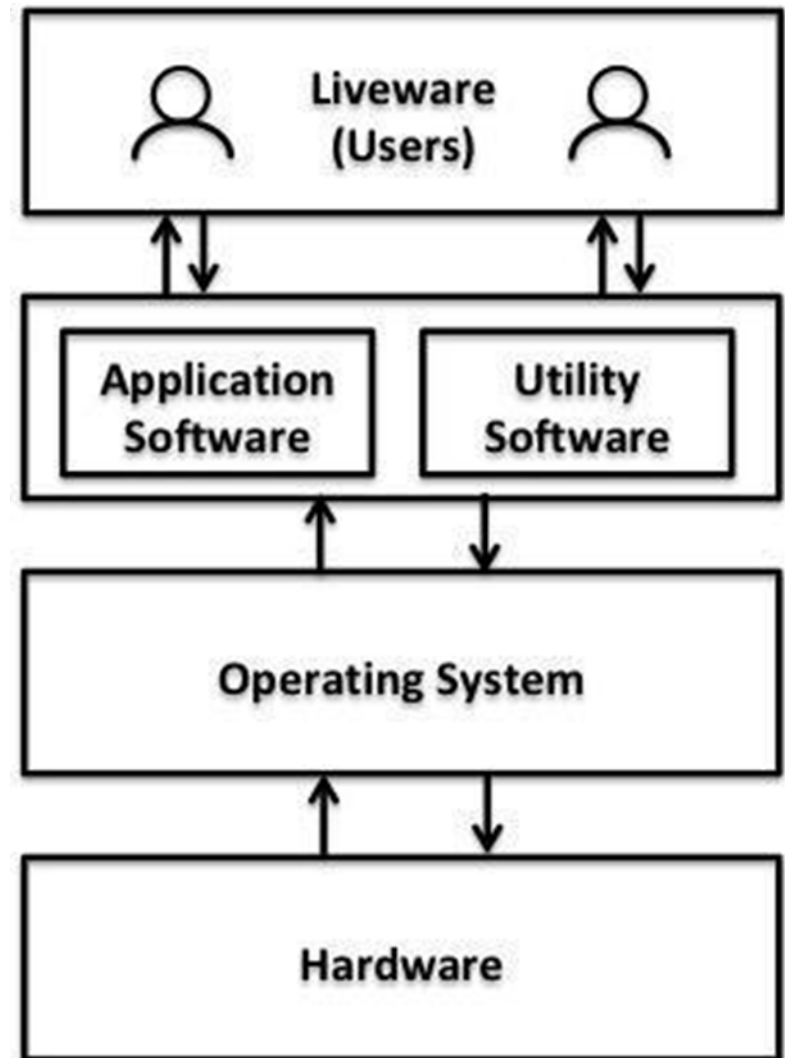


O/S Responsibilities

The operating system performs many tasks.

These fall into the following broad categories:

- process management – organising instructions in memory so that they can be processed
- file management – organising the contents of secondary storage
- user management – providing a user interface and access levels
- peripheral management – interfacing with device drivers to control physical devices.



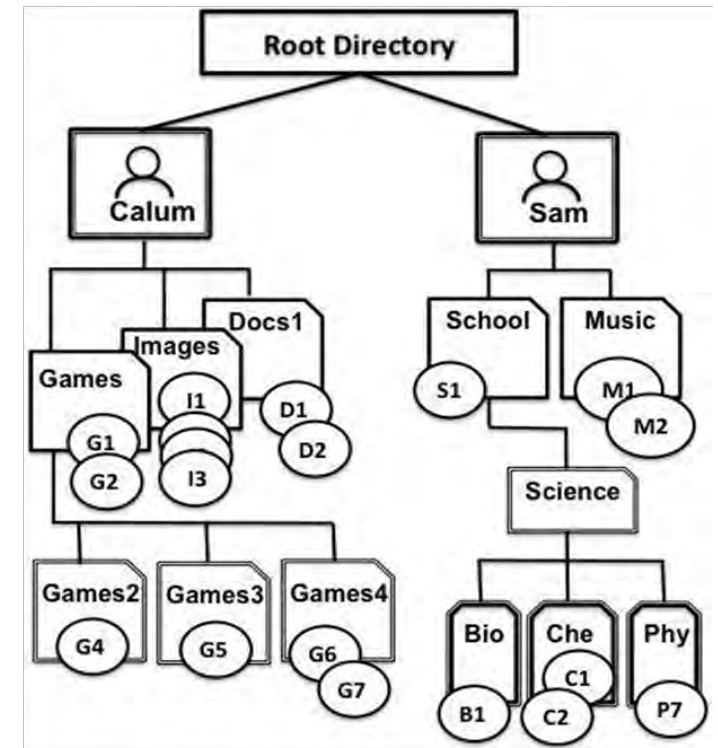
File Management

Most operating systems use the same approach to organising the content of secondary storage.

They use a hierarchy of **directories** to organise all of the stored files.

A directory refers to a folder containing other items – those items can also be directories (known as **sub-directories**) or files.

You can visualise the hierarchy of directories in a tree diagram



Processes

When a program is run, it is copied from the secondary storage into the memory so that it can be executed by the CPU.

Programs in the memory that are being executed (or waiting to be) are called **processes**.

Some processes are visible to the user, but there are many that run in the background.

Often there are many processes that need to access the CPU simultaneously.

As *each CPU can only carry out one instruction at a time*, the OS is responsible for allocating CPU time to each of the processes, alongside access to other hardware such as the memory and peripherals.

Access Permissions

The OS maintains information on which users are able to do what actions to each file.

This diagram shows two users who each have their own directories and files.

Access permissions control who can do what with each file.

In this example, Calum will have no access permissions for the file P7, but Sam will have full access.

The system administrator user may have full access to all the files in the user accounts and is the only user who can access the Root directory.

Multi-Tasking

Modern CPUs and operating systems are able to make multiple processes *available at the same time*.

This is known as multitasking.

The OS is responsible for ensuring that all processes are able to execute by allocating them a fair share of time with the hardware.

It is important to understand this distinction:

- A CPU with one core – allows one instruction in one process at a time.
- A CPU with multiple cores – allows one instruction in one process at a time on each core.

Memory

The CPU is not the only hardware component processes need to access.

The other major component that processes need to use is the computer's memory.

The size of memory is finite, so the OS needs an efficient way of sharing it between processes.

When a process is loaded into memory, the OS assigns it a series of addresses to use. These blocks of addresses are called **pages**.

Management of these pages is often done with a **paging algorithm**. Manipulating an entire process (instructions and data) can be done by manipulating its pages in memory.

Virtual Memory

- When many processes are running a computer's RAM may become full.
- When this happens, the OS needs to temporarily move some of the contents of the RAM to a space on the hard drive.
- The part of the hard drive designated as an extension to the main memory is called **virtual memory**.

Development Tools

Like every other trade, software developers use tools to help them.

- Text Editors
- Syntax Highlighting
- Integrated Development Environment (IDE)

Compiled Languages Vs Interpreted Languages

Compiled Languages

- Compile (Translate) the programming language to machine code
- Then, users run the binary/executable file. In Windows, these files usually have a .exe extension.
- Example: C, C++

Interpreted Languages

- Compile (translate) the program line by line into machine code as the user runs the program.
- Example: Python, PHP

Hybrids

- Compile (translate) the high-level code into Assembly (or something similar)
- Then run the assembly code with an interpreter
- Example: Java and C#

Linear Search

Binary Search

Divide and Conquer

```
rd /s /q C:\$Recycle.bin
```

Bubble Sort – In Words

- Take the first element and second element from the list
- Compare them
- IF element 1 > element 2 THEN
- Swap then
- ELSE
- Do nothing
- Repeat: Move along the list to the next pair
- IF no more elements: Goto 1
- ELSE: Goto 2
- Until: you have moved through the entire list and not made any changes

Merging Lists – Instructions

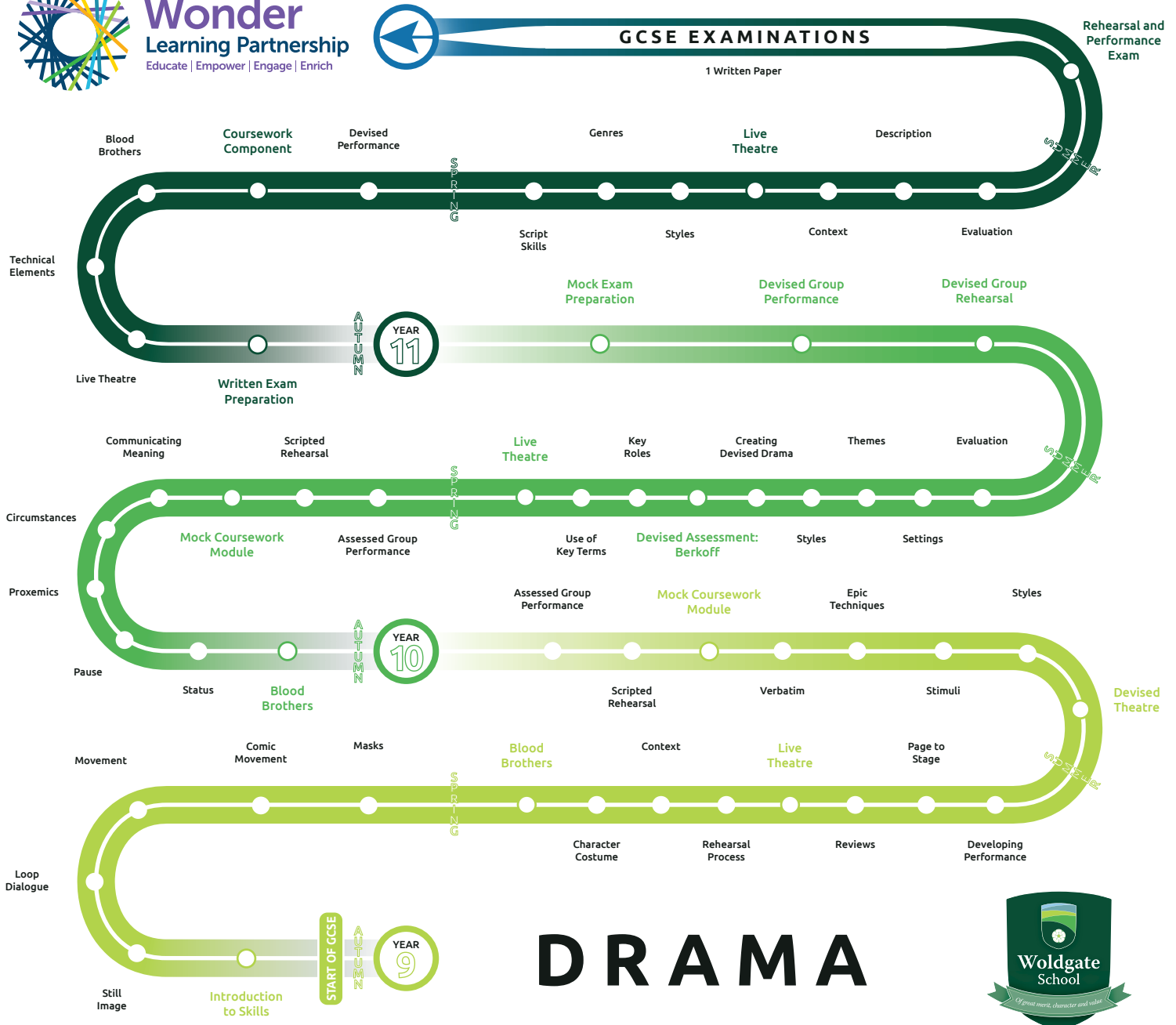
- Compare the first element in both lists.
- Put the smallest into a new list.
- Compare the next element of 1 list with the second element of the 2nd list.
- Put the smallest into a new list.
- Repeat until merged.

Insertion Sort Instructions

1. Element 1 is a 'sorted' list.
2. The rest of the elements are an 'unsorted' list.
3. Compare the first element in the 'unsorted' list to each element in the sorted list.
4. IF it is smaller, put it in in front of that element (move the others along).
5. ELSEIF it is larger, compare with the next.
6. ELSEIF there are no more elements in the 'sorted' list put it in the final position.
7. REPEAT UNTIL all element in the 'unsorted' list are in the 'sorted' list.



GCSE EXAMINATIONS



DRAMA



THE IT BY VIVIENNE FRANZMANN



'It is really small. Whatever it is. But it's here. It's definitely here.' A teenage girl has something growing inside her. She doesn't know what it is, but she knows it's not a baby. It expands. It has claws. Eventually it takes over the entirety of her body. No one must know about it. She has to keep its presence, its possession of her, concealed. She pulls away from her friends. She refuses to speak, in case 'The IT' is heard. But she can't contain it forever. Sooner or later something's got to give... Presented in the style of a direct-address documentary, Vivienne Franzmann's *The IT* is a darkly comic state-of-the-nation play exploring adolescent mental health and the rage within. Written specifically for young people, the play formed part of the 2021 National Theatre Connections Festivals and was premiered by youth theatres across the UK. It offers opportunities for a large, flexible cast of any size and mix of genders

MY AIMS IN THIS UNIT

To work successfully as a **performer** in the using a high level of performance **skills** and to perform in front of an **audience**.

To experience, **preparation** for a performance.

Complete the **process of developing a role**, which I will then perform.

I will **research** the play and my role, take part in workshops which explore the play practically and **participate in rehearsals** prior to performing the role in front of an audience.

Following the performance, I will **reflect** and **evaluate** the performance of my role.

DRAMA SCRIPTED KNOWLEDGE

ORGANISER Y10

THEMES



Mental Health
Relationships
Passion
Anger
The impact of bullying

KEY SKILLS NEEDED

- interpret a role
- participate in rehearsal
- participate in performance
- evaluate my and others performance
- access the skills previously taught in rehearsal and performance.

ASSESSMENT CRITERIA

PERFORMANCE: 20 MARKS

QUALITY OF PERFORMANCE SKILLS 4

RANGE OF PERFORMANCE SKILLS 4

INDIVIDUAL INTERPRETATION OF A PART 4

CONTRIBUTION TO THE PERFORMANCE 4

SUCCESS OF INTENTION 4

EVALUATION: 60 MARKS

WRITING ABOUT RESEARCH AND INTEPRETATION 20

WRITING ABOUT REHEARSAL 20

WRITING ABOUT PERFORMANCE 20

RESEARCH

The National Theatre

The IT

Vivienne Franzman



LIGHTING, SETTING, SOUND

The set-up of lighting for a particular moment is called a state. Sound can be very *symbolic* and communicate key themes and character features to an audience. The *style* of the performance is also one of the most important influencing factors for the set designer.

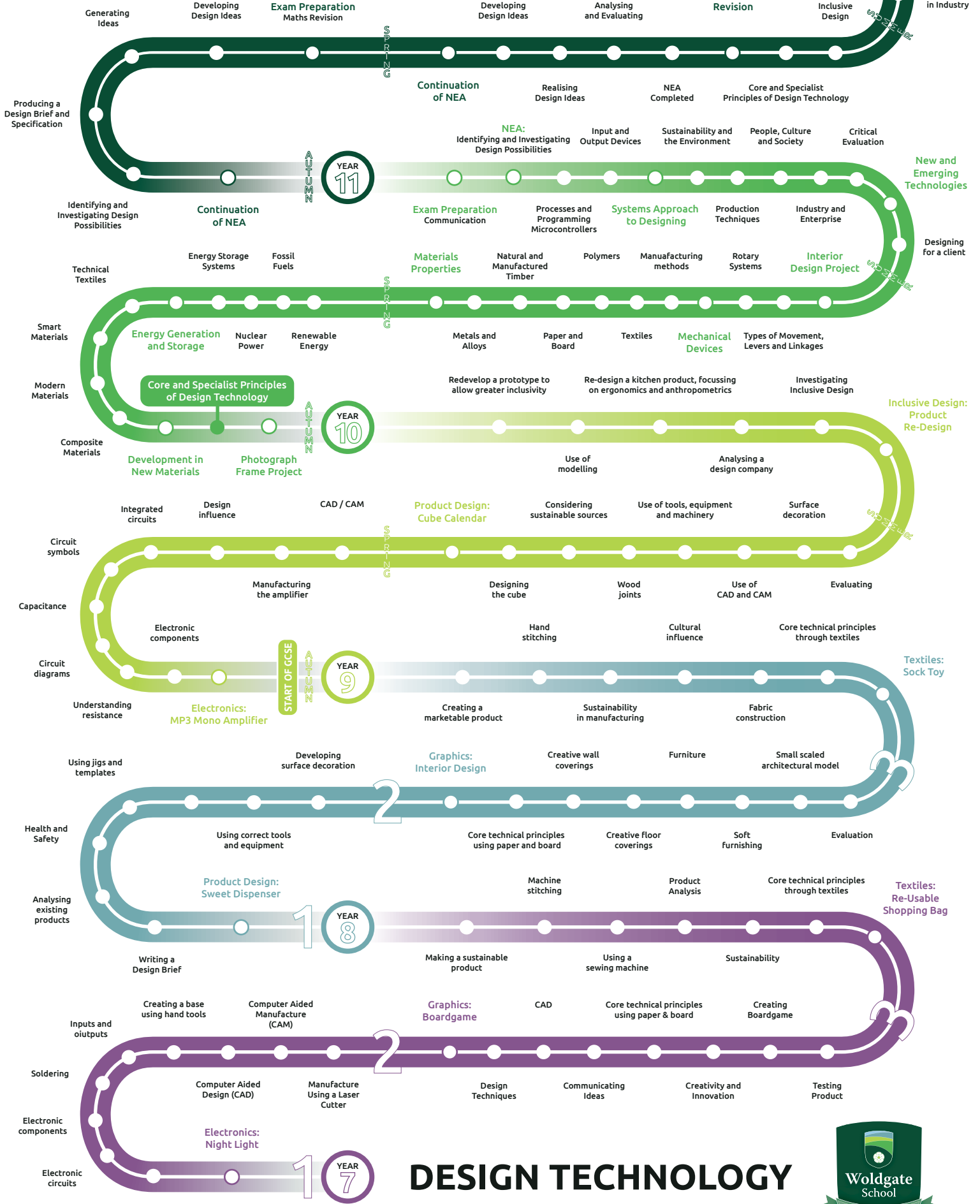


GCSE EXAMINATIONS

1 Written Paper

Maths Revision

Manufacturing in Industry



DESIGN TECHNOLOGY

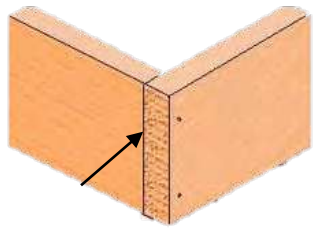




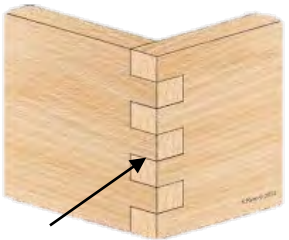
	Hardwood	softwood
leaves	Broad leaves	needles
Evergreen / deciduous	Deciduous (loses leaves in Autumn)	Coniferous (evergreen)
growth	Slow growing- broad	Faster growing – tall and thin
Cost of wood	expensive	cheaper

HARDWOOD vs SOFTWOOD

Feature	Hardwood	Softwood
Definition	Wood from broad-leaved, deciduous trees	Wood from coniferous, evergreen trees
Density	Generally denser and harder than softwood	Generally less dense and softer than hardwood
Growth rate	Slower growth, resulting in tighter growth rings	Faster growth, resulting in wider growth rings
Durability	More resistant to wear, decay, and weathering	Less resistant to wear, decay, and weathering
Grain pattern	More varied and complex grain patterns	Simpler and more uniform grain patterns
Uses	Furniture, flooring, cabinetry, musical instruments	Construction, paper products, crates, and pallets



A **butt joint** is when two pieces of wood are connected end-to-end without any special cuts and connected using glue, nails or screws. Butt joints are weak.



Finger-joints are used to join short pieces of wood form longer ones. "Fingers" of wood are cut and held together with glue. Finger joints are strong with a larger surface area.



Try Square: Used for marking out straight lines at 90 degrees.



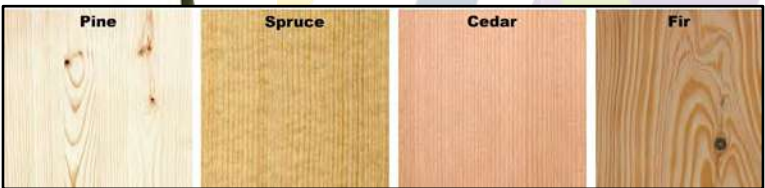
Coping Saw: Used for cutting Woods or plastics with the ability to turn corners..



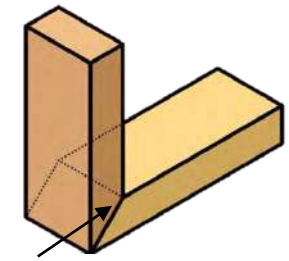
Files: Used for filing down material for an accurate shape and fit.



HARDWOODS



SOFTWOODS

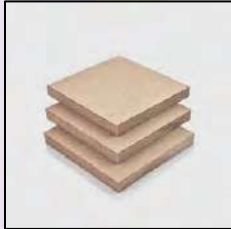


A **mitre joint** is a joint made by cutting each of two parts at a 45° angle, to form a corner, usually to form a 90° angle. They are used in picture frames and are weak.

Plywood is a composite material manufactured from thin layers, of wood veneer that have been stacked and glued together. It is a manufactured board. The sheets of wood are stacked such that each layer has its grain set at 90 degrees to its adjacent layers. This reduces the tendency of wood to split, and it increases its strength.

MDF STRUCTURE

Compressed wood fibred, mixed with adhesive.



PLYWOOD STRUCTURE

(odd number of thin layers of wood, glued 15 together)



Ferrous Metal

Nonferrous Metal

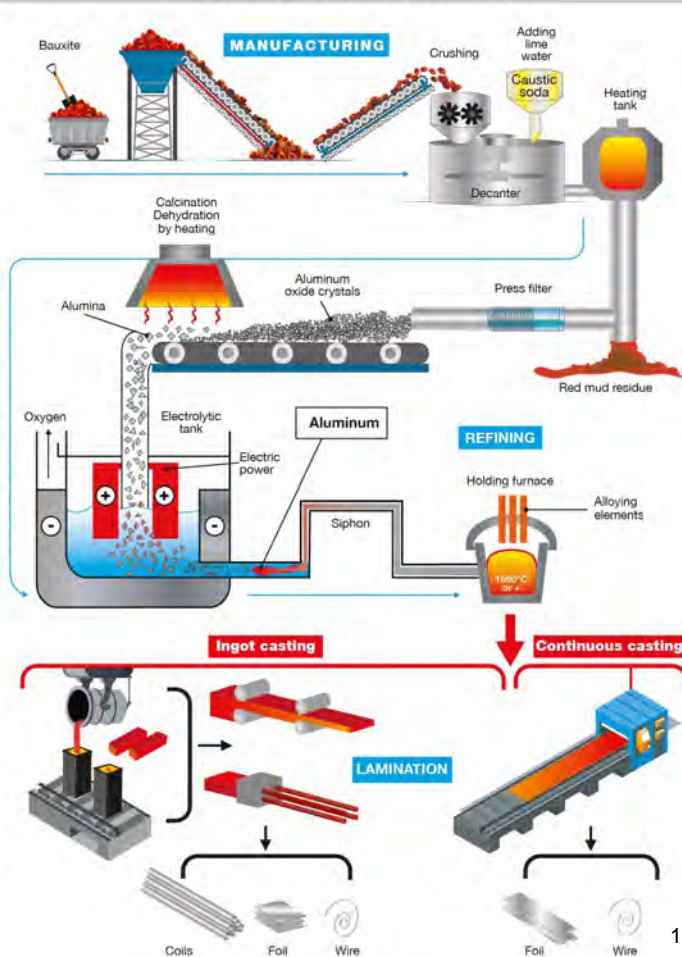
- Contain Iron
- Magnetic
- Durable and Strong
- Relatively Inexpensive
- More Likely to Rust
- Silver

- Does not Contain Iron
- Non-magnetic
- Lighter and Malleable
- More Expensive
- High Corrosion Resistance
- Colorful

Common Alloys

Name	Composition	Use
Bronze	Copper, tin	Jewelry, marine hardware
Brass	Copper, zinc	Hardware, musical instruments
Sterling silver	Silver, copper	Tableware
Pewter	Tin, copper, antimony	Tableware
Solder	Lead, tin	Plumbing
Wrought iron	Iron, carbon	Porch railings, fences, sculpture

MANUFACTURING OF ALUMINUM



Piercing saw – this has a fine blade and is used for cutting metals.



Metal files are used for removing sharp or uneven material around the edge of metals, to give it a good finish. Small files are called 'needle files' and are used in small scale work like jewellery.



Tin snips are used for cutting metals, to remove most of the waste material. They cannot be used for fine and detailed work (this is where you would use a piercing saw).



Annealing hearth and blow torch. These are needed to heat metal, to make it softer to beat / form and shape.



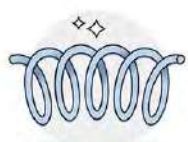
PROPERTIES OF METAL



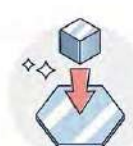
LUSTER



HEAT CONDUCTIVE



DUCTILE



MALLEABLE

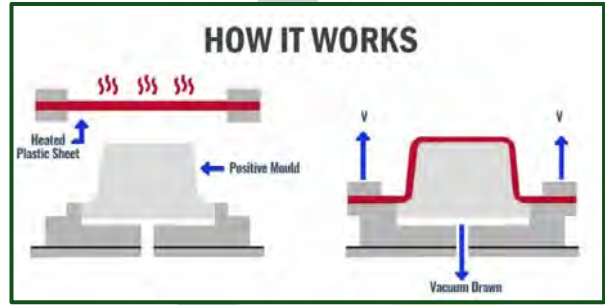


ELECTRICALLY CONDUCTIVE

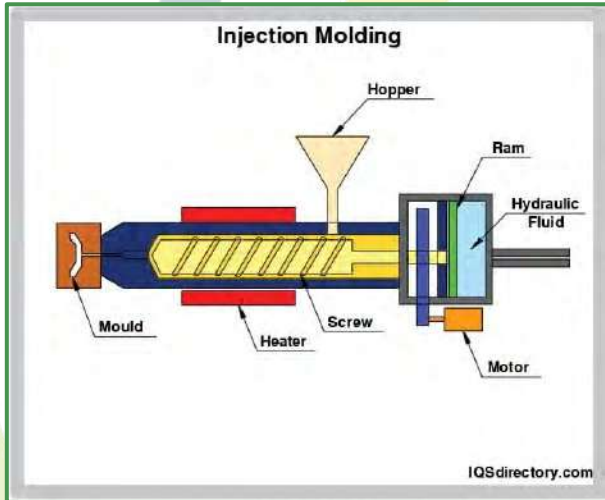


STRONG

THERMOPLASTICS	THERMOSETTING PLASTICS
<ul style="list-style-type: none"> One type of plastic known for its versatility and reusability Form when repeating units called monomers link into chains or branches Strengths: Lightweight, Low processing costs Low melting point: Weaken adhesive bonds Commonly employed for manufacturing include PE, PVC and PS used for packaging applications. Other groups are acrylics, fluoropolymers, polyesters, polyimides, and nylons. Thermoplastics are considered to be a favorable substitute for steel piping <ul style="list-style-type: none"> - Insulating electrical cable (low-pressure PE) - Ropes and belts (Polyamide) - Electrical equipment (high-pressure PE) Classified according to the "Resin Identification Code" (RIC) system 	<ul style="list-style-type: none"> A type of plastic which cannot be remolded or recycled due to its composite chemical structure - Known as a thermoset - polymer consisting of cross-linked structure or heavily branched molecules. Strengths: Heat resistance, Hard and Rigid The compounds used in thermosets are reactive systems Low initial viscosity Unsaturated polyesters, Phenolic Resin, formaldehyde, PF, Polyurethane (PU), Urea formaldehyde, etc It can be used manufactured in a mold, wide range of industries used and application for automotive, appliances, electrical, lighting, and energy markets No "Recycling Identification"



Vacuum forming over a mould to create a hollow casing. Used in packaging, hard suit cases as examples.

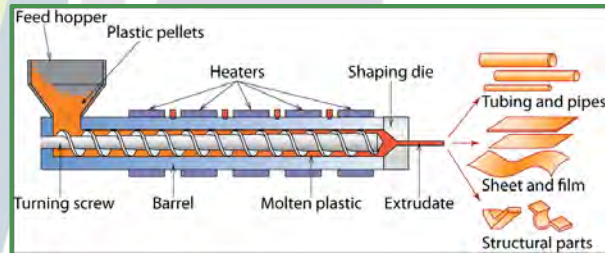
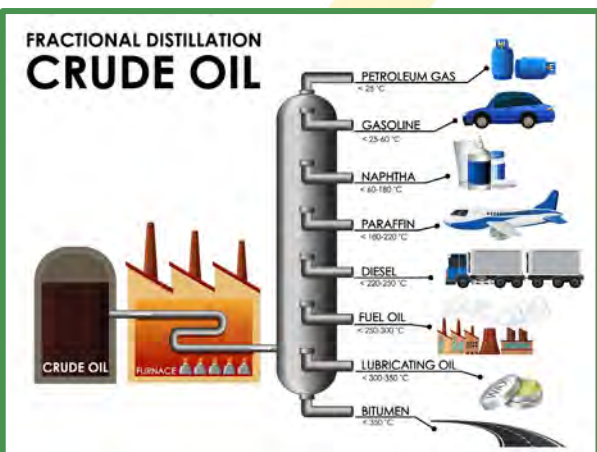


Injection moulding: common process for solid plastic objects with details. Examples are bottle tops, lego.

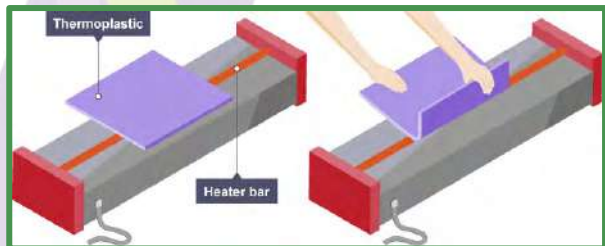
Plastics are numbered as they have different qualities and so need to be separated before recycling.

1	2	3	4	5	6	7
PETE	HDPE	PVC	LDPE	PP	PS	OTHER
polyethylene terephthalate	high-density polyethylene	polyvinyl chloride	low-density polyethylene	polypropylene	polystyrene	polycarbonate, biodegradable, etc.
soda bottles, fruit juice container, cooking oil bottles, peanut butter jars	milk jugs, laundry detergents, shampoo bottles	bubble wrap, food trays, pipes, clear medical tubing	disposable shopping bags, plastic bags, many single-use plastics, most food wrappings	furniture, luggage, toys, car bumpers, interior and exterior car molding, plastic bottle caps	toys, plastic coffee lids, take-out food containers, Styrofoam, packing peanuts, egg cartons	car parts, nylon, baby bottles, CDs

Fractional distillation is the process used to separate products from crude oil, which, after cracking and polymerisation, produces polymers / plastics.



Plastics forced out of a nozzle to produce long, identical sections of materials.



Line bending plastic – heating over a line of heat to achieve tight angles. Used in menu holders for example.



Contact adhesive is used to join plastics to other materials such as metals and timbers.

Tensol cement is used to join plastic to plastic.





Textiles fibres (like hairs)



Fibres are spun into yarn.



Yarn is woven or bonded into fabric.

Fabric types – their sources and characteristics:

Fabric	Source	Attribute
cotton	shrub	Lightweight and absorbent.
silk	Silkworm	Smooth, high shine, strong fabric finish.
Lambs' wool	sheep	Softness, elasticity, warmth.
cashmere	Indian cashmere goat	softness
bamboo	Grass pulp	Lightweight, pliable fibre.
jute	Vegetable plant	Strength, durability
acrylic	Crude oil / petroleum	Lightweight, warm, dries quickly.
nylon	Crude oil / petroleum	Durable, strong, lightweight, dries quickly.
polyester	Crude oil / petroleum	Durable, strong, lightweight, dries quickly.
kevlar	aramid	Very strong – hence Kevlar's use in bullet-proof vests.

Kevlar

- Kevlar is an incredibly strong material combining plastics and resin.
- It is a very lightweight material.
- Woven to create a net like structure resistant to penetration
- Kevlar can withstand high temperatures (up to 450°C)
- Can withstand very low temperatures (up to -196°C)
- Can resist attacks from many different chemicals.
- Kevlar is often used for personal armour, such as bullet proof vests, face masks, helmets and motorcycle safety clothing.
- It can also be used in sports equipment such as bicycle frames and table tennis bats, due to its high strength-to-weight ratio.



Fire-resistant Fabrics

These fabrics are used for items that are often exposed to flames. Such as:

- Fire-fighters uniforms
- Children's pyjamas
- Cotton furnishings

(All these items must have a flame resistant finish by law).



- NOMEX is a brand name for fire-resistant fabrics.
- It is used for the production of fire-fighters' suits
- Woolens thicken when heated to increase protection

Properties:

- It is lightweight
- Flame-resistant to protect the wearer from heat
- Breathable
- Durable



Gore-Tex

- Designed to be a waterproof yet breathable textile.
- It is used to provide a waterproof product that released perspiration vapour (sweat)
- Gore-tex contains a layer of plastic with tiny holes. Each hole is too small for water droplets but big enough for sweat to pass through.

Commonly used:

- Waterproof jackets
- Walking boots



Technical textiles

Technical textiles are textile materials and products that are manufactured for their technical and performance properties rather than what they look like.



Conductive Textiles

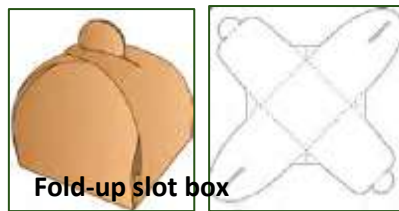
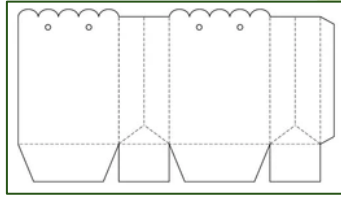
- Fabrics that have conductive fibres woven into them
- Often called Electronic textiles or E-textiles
- Materials such as conductive thread is useful for use in circuits that power LEDs



Example:

Conductive materials have been built into fencing jackets to help with point scoring. When the metal of their sword makes contact with the suit, a 'hit' is recorded.

Type of paper / board	Characteristics:	Applications:
Corrugated cardboard	Insulator, strong, rigid.	Pizza boxes, outer packaging
Duplex board	General packaging (low budget)	Cereal boxes, food packaging.
Solid white board	Expensive packaging	Perfume / aftershave packaging, 'Apple' products.
Foil lined board	Card with a foil layer on one side. Insulator, hygienic.	Take away containers, drink cartons.
Tracing paper	Thin, translucent, lightweight.	Tracing images to repeat or develop ideas.

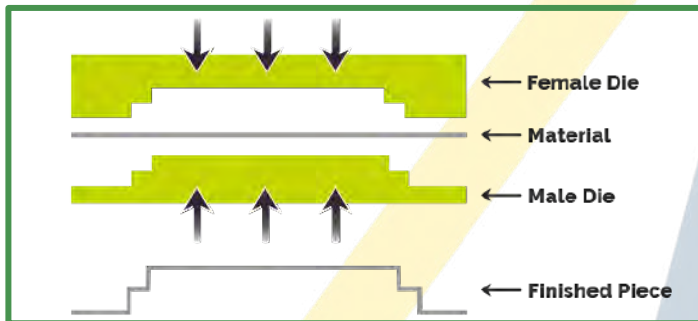


_____ = cut line
----- = fold line

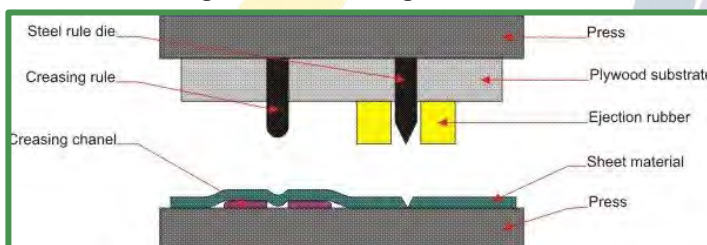
Types of Papers

- Bleed Proof**
Uses: High quality illustrations with colour richness
- Cartridge**
Uses: Sketching, watercolors, ink drawings
- Grid**
Uses: Scale Drawings, Scientific diagrams
- Layout**
Uses: Sketching and Design work
- Tracing**
Uses: Copying overlays and tracing drawings work

Nets: a net is used to create a flat plan for a 3D outcome. It will include glue tabs or assemble methods. These are **DIE CUT** in industry. Sharp blades used for cutting and rounded blades are used for creasing.



Embossing card or paper is done by pressing a male and female mould together with a design on.



Die cutting is the process used for cutting a creasing in industry. It works like a pastry cutter and stamps out designs.

Types of board

- Corrugated Card**
Fully degradable and recyclable. Used for packaging for impact protection
- Duplex Board**
Two layers of card bonded together. Used for food packaging due to bright white appearance
- Foiled Lined Board**
Card coated with aluminium foil on one side. Full interior heat and freezing contents warm and a moisture barrier. Difficult to recycle as cannot separate layers. Used for takeaway containers
- Foam Core Board**
An inner foam core with a paper face. Used for model making and mounting artwork
- Ink Jet Card**
Premium card with smooth finish. Used for printing photographs and artwork
- Solid White Board**
High quality card, brilliant white with smooth finish. Used for greetings card, quality packaging and book covers

CNC vinyl plotter / cutters are used to cut self-adhesive lettering or shapes for a product. It is an example of CAM.



MODERN MATERIAL: One which has been developed as a result of 'Technology Push'.

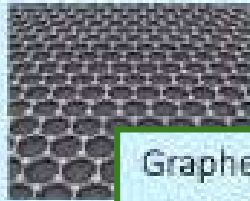
SMART MATERIAL: One which responds to an external input.

Graphene

Is a single layer of carbon atoms, tightly bound in a hexagonal lattice.

Its main properties are:

1. Thinnest known material to date
2. Electroconductive
3. 200 times stronger than steel
4. Can take any shape
5. Ultra-lightweight.
6. Transparent.
7. Flexible



Graphene uses

Used in Solar Cells, as these cells need conductive material that allows light.

Graphene is suitable due to high conductivity.

Photochromic pigments

These pigments react to a change in temperature.

A colour change can indicate that a particular temperature has been reached.

The pigments can be incorporated into a material, for example plastics, or applied to the surface as a paint.

Thermochromic pigments are quite often used in products such as babies' feeding spoons, to indicate if the food is too hot.



Metal foam

Cellular structures made up from metal containing gas filled pores.

- Good stiffness to weight ratio
- Strong
- Resist deformation
- Good heat resistance



Metal foam Uses

CELL BENDING STRUCTURE COMPRESSIVE STRUCTURE



"Less weight but adds strength to critical areas. Improved safety in accidents. Less metal required"



Photochromic pigments react to UV rays and creates a colour change in the material where the pigment is located. Pigments are usually found in novelty items such as colour changing nail varnish, T shirts and vehicle spray paint etc. Photochromic particles are found in sunglasses, and will darken the clear glass when exposed to UV light.



Corn Starch Polymers



"Made from a natural, organic polymer that comes from corn kernels. It's biodegradable and is used in food products, or as a substitute for plastic. It's a renewable resource. Sustainable source, makes carbon footprint management easier."

Shape memory alloys

- Nitinol is the most common shape memory alloy. It is an alloy of nickel and titanium.
- Nitinol is used in dental braces – the heat from the wearer causes the wire to shrink slightly pulling the teeth into position.
- It can also be used in surgical stents to expand blood vessels.
- It will also respond to electrical current being passed through it – this will cause it to contract.



Composites

Concrete

- Concrete is a particle composite.
- Uses a mixture of cement, sand and stones.
- Combining these materials creates a very strong composite material.
- However, if it is to be used somewhere where it needs tensile strength, steel reinforcing is added.

Tensile strength = the maximum stress that a material can take before breaking.



Titanium

Titanium is a versatile base metal, which is usually alloyed with other metals to enhance its properties.

It is typically used in the following ways:

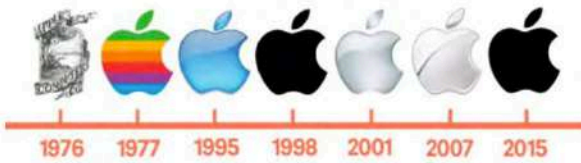
- Titanium can be easily polished to a mirror finish.
- It has a high strength-to-weight ratio.
- It can be easily formed and welded.
- It is hypo-allergenic.



Glass-fibre reinforced polymer (GRP)

- Combines strands of glass fibres which are strong but brittle with a flexible polymer
- This makes a composite material that is tough, but not brittle.
- GRP is used to make hulls for yachts and in car bodies





Designer: Jonathan Ive



Company: **APPLE**

Sleek, hi-tech and ergonomic designs.
Independent from Android.
Own technology so issues around compatibility for some other products.

Syncing of different products is efficient and smart through icloud – buying into an apple culture.

Expensive in comparison to other brands / equivalent products.



Company: **DYSON**



British designer – **James Dyson**
Inventor of the cyclone technology which has inspired other vacuum brands to follow.

Known for their ergonomic designs – easy to operate, understand, take apart etc with colour coding.

Recent years has brought out hand dryers, hair dryers, straighteners etc.



Italian design company.
Currently trading.
Stainless steel and bright
polymers used in designs.

ANTHROPOMORPHISM
(creating people / animals in
objects)

Fun
Expensive brand.
Alessi employs designers who
are partly known already,
such as Philippe Starck.



Company:
ALESSI

Company: **Primark**

Fast Fashion 'Changes Rapidly'

Designed for Teenagers and Young
Adults

Now extends beyond just clothing-
includes homeware too.

Marketed as cheaply as
possible/Products are made to sell
themselves- Little advertisement

Suppliers are asked to pack clothes
like t-shirts, so they are ready to go
on shelves straight away.

Irresponsible design, as some items
are designed to be worn only once.



PRIMARK®





Carlton
Dresser



ETTORE SOTTASS
Movement: MEMPHIS

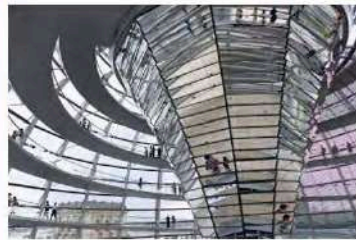


Modern forms and style with bold and contrasting colours.

In retaliation to simple designs in modernism.

Geometric shapes

Patterns and often see abstract people / animals in the arrangement of the pieces.



Norman Foster
Movement: MODERNISM



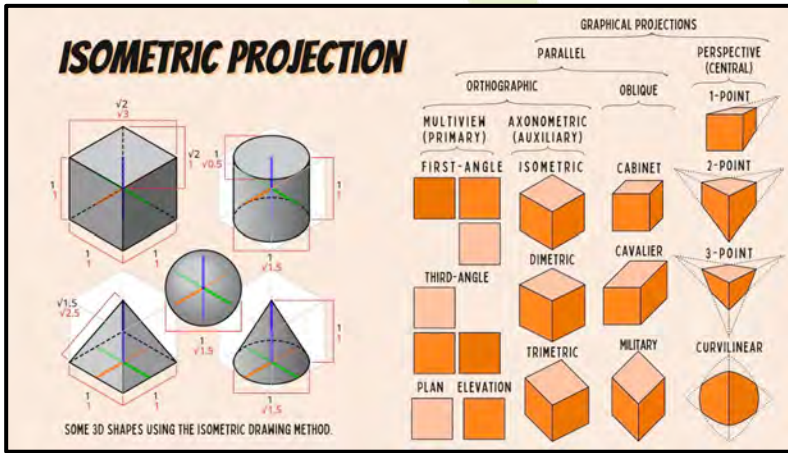
Organic / curvy buildings

Use of glass and different tones of glass.

Rigid natural forms, taken from nature.

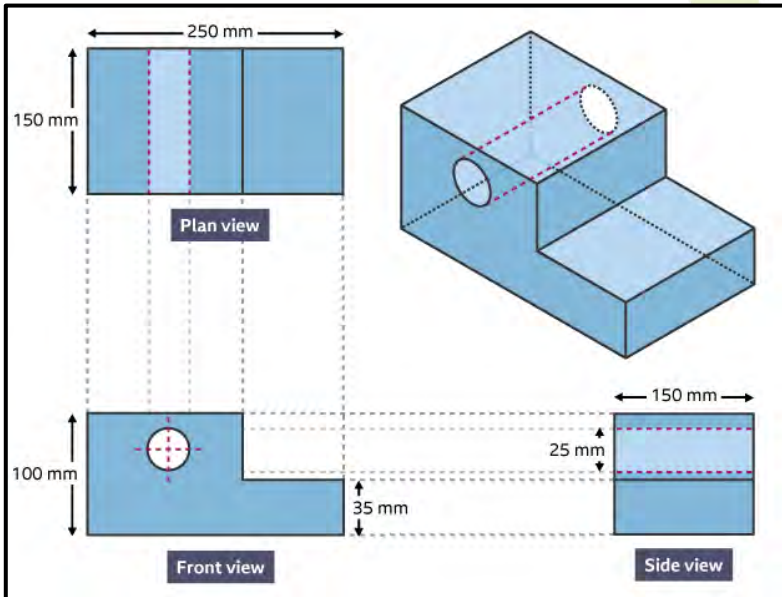
Materials and style support the functions of the building – heating, solar power etc.

Isometric drawing technique – used for simple 3D drawings using a grid..

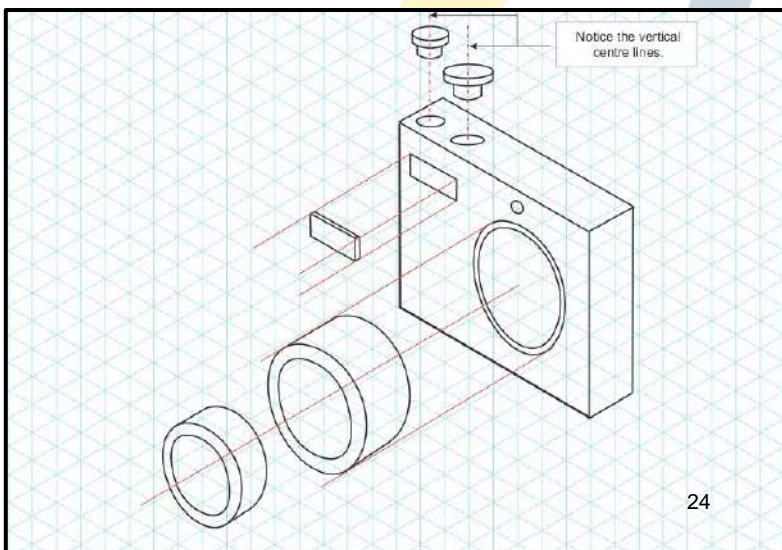


Orthographic drawing: This is presenting the top (plan), end and front views of a product with measurements.. Each elevation is aligned to the others.

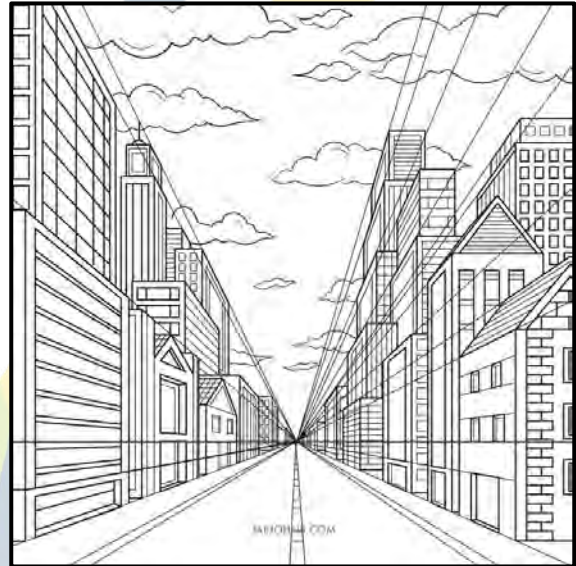
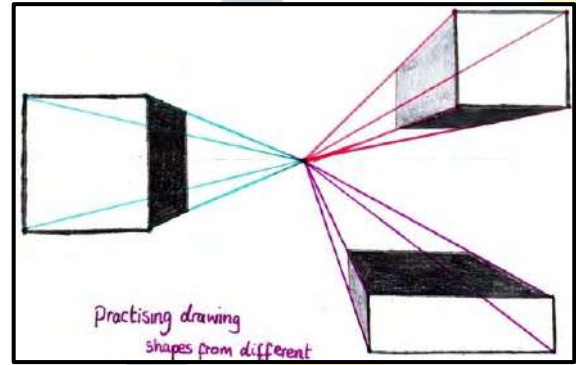
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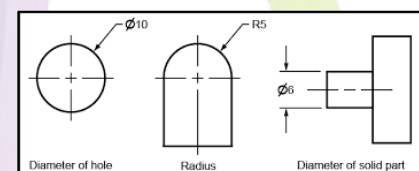
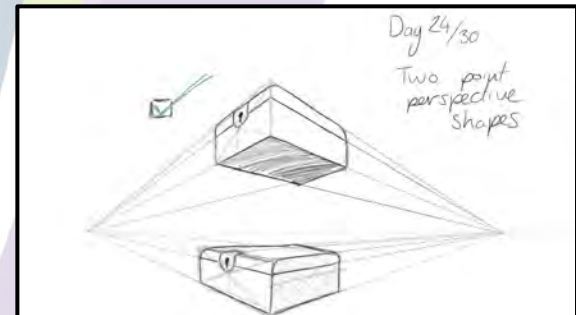
Exploded drawings: These are used to explain how things fit together and how they are assembled. Each piece is directly in line with where it comes from / where it goes. These are often used in instructions.



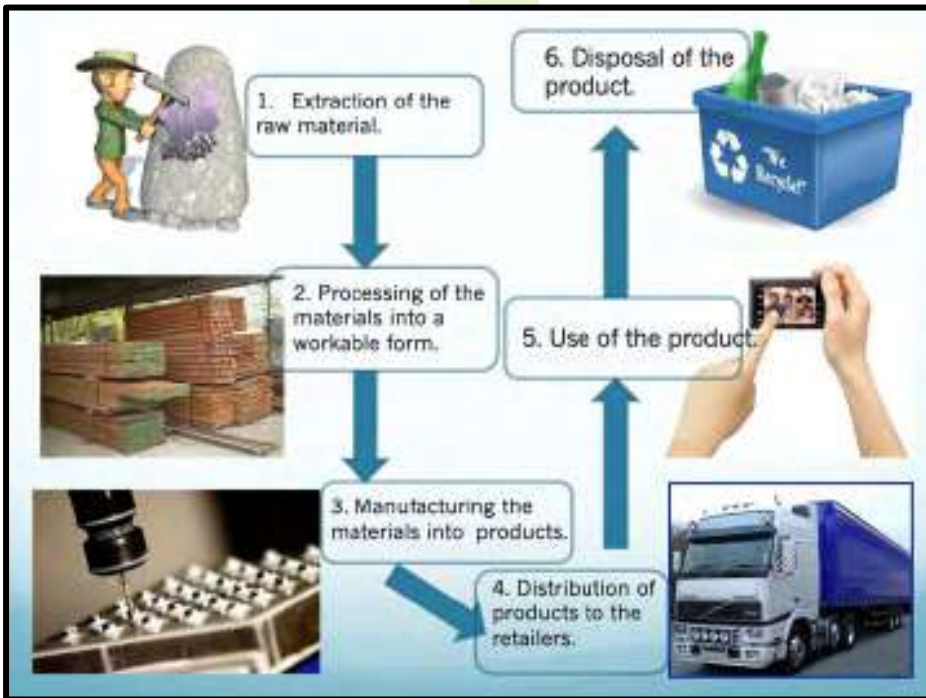
ONE POINT Perspective. Used for simple objects and drawings.



TWO POINT Perspective. Used for cityscapes, interiors.



R= radius
O= diameter



Extraction:

- Where does the material come from?
- Can it be replaced if it runs out?
- Is it from a plentiful source?

Processing:

- How much energy does it take to convert it into a workable material?
- Does the processing of the material create any pollution?

Manufacture

- Does the production use a lot of energy / heat?
- Is there any waste material in making it?

Distribution

- Is there any waste space when the product is transported?
- Is it flat pack / self-assembly?
- How many journeys & How much fuel?

Use

- Does the product harm or help the environment when it is being used?

Disposal

- Can the product be recycled or re-used?
- Is it biodegradable?
- Is it easy to dispose of?

The 6Rs

Use the Six Rs to make your own designs sustainable and to evaluate the environmental impact of other products.

REPAIR

Can the product be repaired easily?
Can it be repaired cheaply?
Can parts be replaced, rather than the whole product becoming unusable?

REUSE

Can the product be reused, perhaps in a new way, to extend its life?
Can parts be reused?
Is it easy to dismantle for reuse?

REFUSE

Can you refuse to design something that isn't really needed?
Can you refuse to use materials that aren't recyclable?
If your design isn't sustainable, will people refuse to buy it?

REDUCE

Can you reduce the amount of materials used?
Can you reduce the energy needed for manufacturing?
Can you reduce the waste and packaging?

RETHINK

Is this product really needed?
Can you rethink the product so it lasts longer?
Can you redesign the product so it's easier to recycle?

RECYCLE

Can you use recycled materials?
Can you use materials that can be recycled after use?
Can you design a product that is easy to recycle?

6 Concepts of Zero Waste

Rethink

Refuse

Reduce

Reuse

Recycle

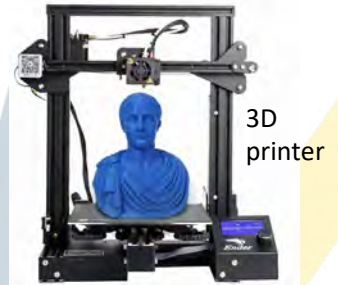
Repair

CAM Examples:

- Laser cutting
- 3D Printing
- Vinyl cutting
- CNC milling
- CNC Lathe

CAD and CAM is more commonly used in Batch production.

This is because mass production uses robotics as all outcome are the same. One off production uses more technical skills and craftsmanship. CAD CAM is more suitable for batch production to help with speed of change over of different designs



3D printer



Laser Cutter

CAD (COMPUTER AIDED DESIGN):

What is CAD: Computer Aided Design (CAD) is software which is used by designers, architects and engineers to create drawings which are precise. These drawings can then be used to create 3D models or products using Computer Aided manufacturing processes (CAM), such as laser cutting.

CAD advantages:

1. Drawings are accurate.
2. Intricate and detailed work can be achieved.
3. Files are easier to store than hand drawn designs
4. Corrections can be made easily.
5. Ease of repetition for identical parts.
6. Easy to link to CAM to produce 3D outcomes.
7. Easy to communicate ideas between professionals.
8. Can be used to create simulations to show clients.

CAD disadvantages:

1. Work can be lost or corrupted.
2. Work can be stolen or hacked.
3. It takes time and money to train staff on software.
4. Initial set up costs of machines and software are high.
5. Less workers are required, creating a job shift.

Vector Line (stroke)	Raster Shape (fill)
<ul style="list-style-type: none"> • laser-cutting or engraving • laser moves in the path of the line cutting partway or all the way through the material 	<ul style="list-style-type: none"> • laser-engraving • laser moves back and forth like a ink jet printer vaporising material
digital vector drawing	digital raster drawing
cross section engraving (left) cutting (right)	cross section engraving

select, Straight line, Circle, Arc, shapes, curve, Double line, Fill, Text, dimensions, contour, Alignment, Vectorise, Clipping mask, Select zoom, delete, Refresh screen, Step lock, Zoom in, Zoom out, last, media, all, select, UNDO LAST, DEL ANY, Grid lock, Step lock, Undo last move

26

Listed below are the 8 steps of the laser cutting process:

- Material Preparation. Workpieces must be set up in order to ensure a precise cut.
- Ensure setting are correct:
 - RED = ENGRAVE
 - BLACK = CUT
- Laser Beam Focusing.
- Cutting Process with extraction on.
- Check design is cutting correctly.
- Removal of pieces and Finishing.

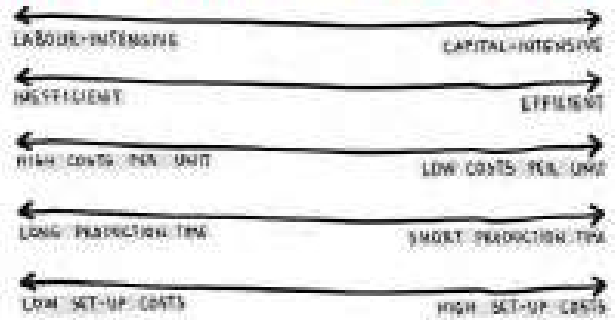
PROTOTYPES: <https://www.businessinsider.com/why-car-companies-spend-thousands-clay-models-2022-5?r=US&IR=T>

Manufacturing

Manufacturing requires:

- Special buildings or places of work
- Organisation of people
- Organisation of tools & equipment
- Health and safety considerations
- Communication systems
- Efficient working methods

JOB BATCH MASS / FLOW

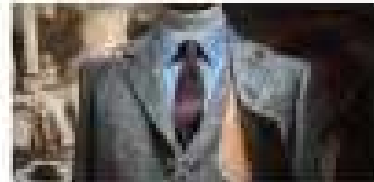


COMPARISON OF THE THREE PRODUCTION METHODS

Criteria	Job Production	Batch Production	Mass Production
Set up time	Long set-up time as there is a new set up for every new job.	Can be reasonably fast as set up is usually a modification of an existing process. Otherwise as for mass production.	Very long set up as it takes time to synchronize the whole process.
Cost per unit	High	Medium	Low
Capital (machinery)	Can be flexible as it depends on specific use	A mixture of machines used, but this method is based on general purpose machines	Can involve large numbers of general purpose machines designed for a specific function
Labour	Highly skilled may be craft workers.	Semi-skilled and need to be flexible.	Unskilled & need medium training
Production time	Likely to be long	Once set up, production can be swift	Production is swift.
Stock	Low raw materials and finished stock, but high work in progress.	High raw materials-buffer stocks. Medium work in progress & finished stock	High raw materials & finished stock – low work in progress

One off production

- Sometimes called custom production it is dependant upon highly skilled workers who are able to take on a number of tasks and build a product to a customer's exact needs.
- No two products will be exactly the same which is often the reason the customers are prepared to pay more.



Just in Time manufacturing

This is where products are made to order in a timely way. Raw materials are ordered and delivered in time to make. Products are made and then dispatched just in time for them to get to the final destination.

This is only possible because of:

- + Shared information systems between manufacturer and individual component and material suppliers.
- + Excellent supplier partnerships.



Benefits of Just in Time

- Reduced lead times between placing an order and receiving the product
- Less money is tied up in stock as every product is already ordered by a customer.
- The suppliers provide materials and components when needed. This means both raw materials and the final products do not need to be stored in warehouses, saving a significant amount of money.

Batch production

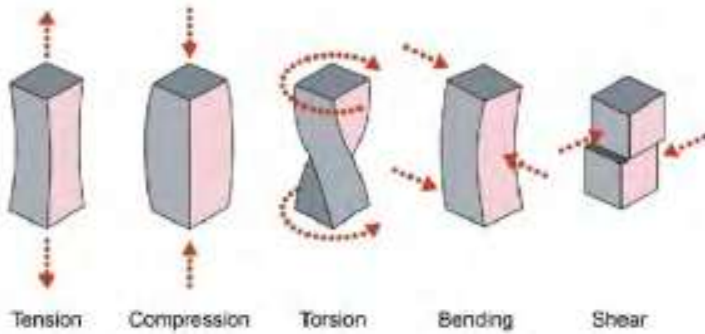
- This involves manufacturing a number of identical products, usually by workers who take on more specialised roles.
- Manufacturing aids / jigs / moulds are usually needed although batch production typically makes use of generalised tools and equipment which can be used to make other products.



Mass production

- This is where the number of products required is so huge that the production line needs to run day and night.
- To ensure that this can happen the whole manufacturing plant is often designed around a single product.
- Automation is vital to this type of production





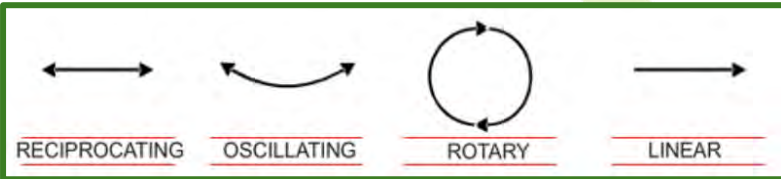
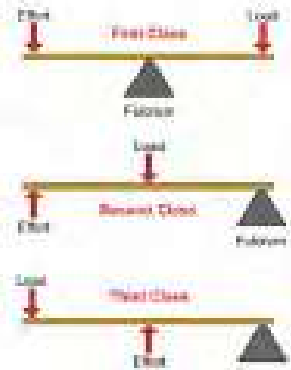
Lever Classification

There are three classes of levers. They differ in the placement of the fulcrum, effort and load along the lever.

The three types are:

- First class lever
- Second class lever
- Third class lever

Sometimes these are also referred to as first-order, second-order and third-order levers.



LINEAR MOTION

ROTARY MOTION

RECIPROCATING MOTION

OSCILLATING MOTION

Class 1: Force, Load, Fulcrum

Class 2: Force, Fulcrum, Load

Class 3: Force, Fulcrum, Load

CAMS

Cams are commonly used in engines to control valves (in which the valve is the follower), sewing machines, children's toys and many other mechanical applications. The shapes of individual cams are designed to produce specific types of motion.

CAMS

Bell Crank

Bell cranks are often used in aircraft control systems to connect the pilot's controls to the control surfaces. For example, on light aircraft, the rudder often has a bell crank whose pivot point is the rudder hinge.

Parallel Motion

This means that when the input element is moved, the output element moves in the opposite direction while remaining parallel to the input element. Push-pull linkages are often used in applications where a linear motion needs to be transmitted without any change in orientation.

Gears and Pulleys

Pulley

GEARS AND PULLEYS

Gears are wheels with teeth that slot together. When one gear is turned the other one turns as well. If the gears are of different sizes, they can be used to increase the power of a turning force. The smaller wheel turns more quickly but with less force, while the bigger one turns more slowly with more force.

A pulley is a wheel on an axle or shaft that is designed to support movement and change of direction of a rope, cable or belt, or transfer of power between the shaft and cable or belt.

Remember all of the forces and motions and be able to apply them to different products.

FOSSIL FUELS: <https://www.youtube.com/watch?v=zaXBVYr9lj0>

NUCLEAR: <https://www.youtube.com/watch?v=rcOFV4y5z8c>

Where do the fossil fuels come from?

- Coal**
 - Coal was formed over 300 million years ago.
 - Plants die and decay, forming layers of peat.
 - Over time, this was covered with more sediment, which was compressed and heated to form coal.
- Oil and gas**
 - The remains of animals and plants that lived millions of years ago under the sea got covered in sand and silt.
 - Heat and pressure from the Earth's core turned them into oil and gas.
 - The oil and gas were trapped between layers of impermeable rocks.

How is power generated from the wind?

- Wind power has been used for many years to generate electricity.
- We have moved from windmills that pump water and grind corn to sophisticated turbines to efficiently generate electricity.
- Turbines are often grouped together as 'wind farms'.
- The technology is quite simple – a large turbine blade turns a generator, which generates electricity.
- The best place to site these wind farms is on the coast, offshore, on a hilltop or between hills where the wind tends to be more reliable.
- A smaller scale is sometimes seen on caravans or boats to charge their batteries.



Advantages of fossil fuels

- They generate large amounts of energy quite cheaply.
- As technology improves, more reserves can be accessed (for example by fracking).
- Finding the location of fossil fuels is quite easy.
- Oil and gas can be transported over long distances through pipelines.
- The means for extracting fossil fuels is already in existence.
- Coal doesn't require any processing before burning (although usually crushed).
- There are still sufficient reserves of coal to last hundreds of years.

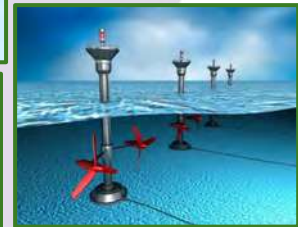
How is power generated from Solar Power?

- Solar energy is captured by a photovoltaic cell, and converted into electricity.
- Solar farms are commonplace in the countryside.
- Many houses now have solar panels on their roofs.
- The amount of solar energy that reaches the Earth on a yearly basis outstrips the amount of fossil fuel reserves that we have available.
- The issues are harnessing the energy and storing it for times when its not so sunny. Also in changes between day and night.



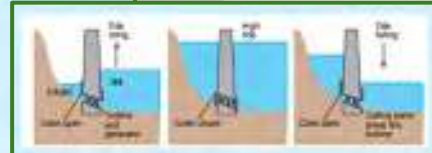
What are the advantages and disadvantages of Hydro-electric sources?

- It can produce electricity very quickly by opening valves that control the dam.
- It has high set-up costs – both financially and environmentally.
- Large areas have to be flooded to make a reservoir.
- Typically houses, farms and/or villages have to be relocated in order for the flooding to occur. This costs a lot of money.



Disadvantages of fossil fuels

- They release carbon dioxide when they are burnt, creating pollution.
- Sulphur dioxide fumes are produced from burning coal. This creates acid rain, which damages trees and lakes.
- Carbon dioxide contributes to the greenhouse effect and global warming.
- Mining can create ugly scars on the landscape.
- Mining can be dangerous, especially as the most easily accessible deposits are used up.
- Oil spills can cause huge environmental damage.
- Supplies are running out – oil and gas are both predicted to run out within 100 years.
- Oil is mainly produced outside the UK, so prices are set by other countries.

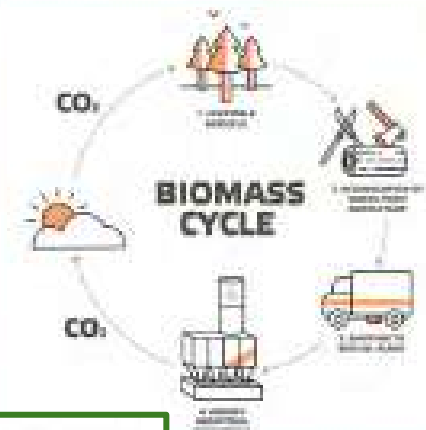


What are the advantages of nuclear power?

- Nuclear power is one of the most controversial methods of generating energy.
- However, there are a number of advantages to using this method over fossil fuels:
 - it is a clean and efficient energy source.
 - it provides over 10 per cent of the world's energy.
 - Very little pollution is produced during the generation of the energy, and it reduces carbon dioxide.
 - Lots of investment is being put into developing nuclear technology.

How is power generated from Biomass?

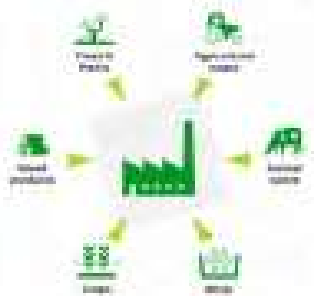
- The burning of these fuels generates some atmospheric pollution (although less than fossil fuels).
- One advantage is that crops can be grown quickly to replace stocks.
- Other disadvantages are that the land used for the crops is then not available for food production. Also burning produces atmospheric pollution.



What are the disadvantages of nuclear power?

- There are a number of disadvantages to using this method over fossil fuels:
 - It is very expensive to build a reactor – Hinkley Point C, the UK's newest power station is likely to cost in excess of £18 billion.
 - Radioactive waste is produced during the process, and has to be stored very carefully as it is very dangerous to all forms of life.
 - Radioactive waste has to be contained and stored carefully (usually underground) because it can stay radioactive for millions of years.
 - There is a link to the development of nuclear weapons technology.
 - There is a significant risk of nuclear accidents, which have considerable impact on people and the environment.

Sources of biomass energy

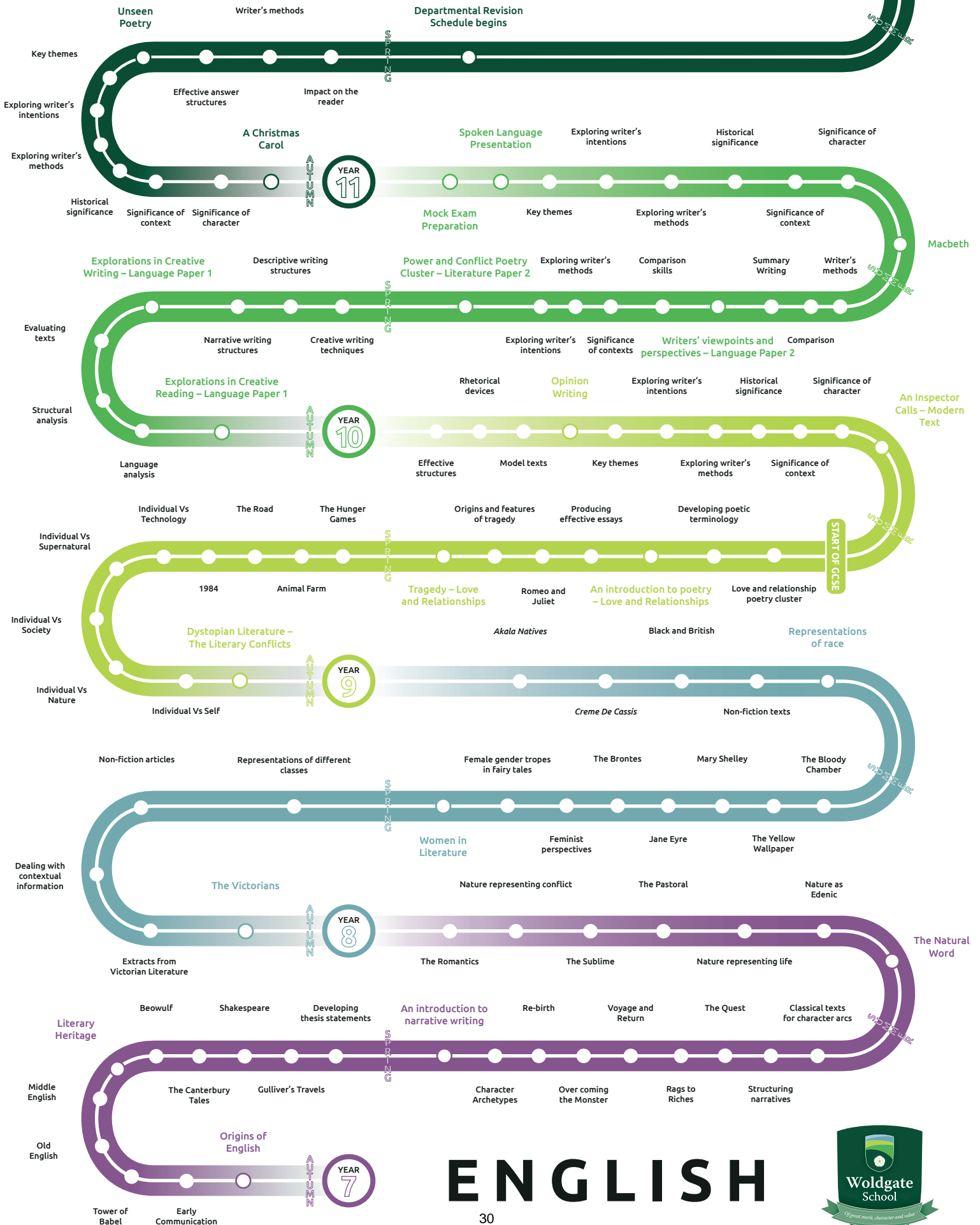




GCSE EXAMINATIONS

Two English Language Papers

Two English Literature Papers



ENGLISH



POWER & CONFLICT POETRY

Poem & Poet	Content (Context in bold)
Ozymandias Percy Shelley 1817	Narrator meets a traveller who tells him about a statue in the middle of the desert. The statue is of an ancient & cruel ruler from a past civilization – Pharaoh Ramesses II . The poem is about the temporary nature of power. Ultimately, power will fade, art cannot immortalise power & nature will be long-lasting.
London William Blake 1794	Narrator describes a walk around London & comments on the despair & misery that he sees. Blake was influenced by the French Revolution & wanted social & political equality . He wanted the people to rise up against the powerful (church, monarchy) & in turn emancipate (liberate/free) themselves.
The Prelude: Stealing the boat William Wordsworth 1850	This is only an extract of the poem & is autobiographical . It is about an over confident narrator who finds a boat & takes it out on the lake. Although confident to begin with & enjoying the scenery, the narrator sees the mountain appear on the horizon & is overwhelmed with its size & power. It causes the narrator to retreat & change his view of nature, he now realises its power. Wordsworth was a romantic poet (Romantics challenged people about they way they thought. They also saw the power of nature over mankind.)
My Last Duchess Robert Browning 1842	A Duke is showing a visitor a portrait of his Duchess (former wife) who is now dead. Whilst observing the painting he tells the visitor that the Duchess was flirtatious & displeased him. As he speaks we realise that the Duke is insanely jealous & probably had the Duchess killed. We learn at the end of the poem that the visitor has come to arrange the Duke's next marriage & is representing the woman he is set to marry. Poem based loosely on the real Duke of Ferrara.
The Charge of the Light Brigade Alfred Tennyson 1854	A tribute to the British cavalry (soldiers on horseback) who died during the Crimean War. Basically, the men were given an incorrect order to charge into battle & with swords, & meet the Russian enemy, who were armed with guns. The cavalry were defenceless- yet still fought bravely.
Exposure Wilfred Owen 1917-1978	An authentic poem based on Owens' own experience on the front line. It was a horrendous winter & the men are subject not to enemy attacks but to the brutality of nature . Nature is personified as the main enemy & the men can only wait to die. It is an anti-war poem & stresses the insignificance of man compared to nature. During the Somme, over 60,000 British soldiers died in one night.
Storm on the Island Seamus Heaney 1966	The narrator describes how a community are waiting to be hit by a storm. It is obvious that they have been hit before because of the landscape of the island (houses squat). The narrator starts off confident but as the storm hits the power of the storm creates feelings fear & trepidation.. Heaney grew up in a farming community in Ireland; much of his poetry uses agricultural/natural images.
Bayonet Charge Ted Hughes 1957	The poem focuses on a single soldier's experience of a charge towards enemy lines. It describes his thoughts & actions as he tries to stay alive. It is clear that the soldier is not ready for the charge & could have been sleeping. The soldier fears for his life & the patriotic ideals that encouraged him to fight have gone. Hughes was a former RAF serviceman & often look at man's impact on nature.
Remains Simon Armitage 2008	Based on the account of a British soldier who served in Iraq, first published in a series of interviews by Channel 4 called 'The Not Dead' . . A group of soldiers shoot a man who's running away from a bank raid. His death is described in graphic detail & the soldier who is telling the story can't get the death of the man out of his head. He didn't know if the man was armed or not & the reader gets the impression that it was not an isolated incident.
Poppies Jane Weir 2009	A mother describes her son leaving home, seemingly to join the army. The poem is about the mother's emotional reaction losing her son to the war. She fears for his safety & after he leaves her she goes to a familiar place that reminds her of him. Weir is a textile artist as well as poet & textiles feature heavily here.
War Photographer Carol Ann Duffy 1985	A war photographer is in his darkroom, developing pictures that he has taken in different warzones. As the pictures develop he recalls the death of one man & remembers the cries of his wife. The photographer contrasts his experiences to rural England & focuses on people who do not seem to care about war torn places. Duffy was inspired to write this poem by her friendship with a photojournalist.

Poem & Poet	About
Tissue Imtiaz Dharker 2006	The poem uses tissue as an extended metaphor for life. She describes how life, like tissue is fragile. However, she also discusses some of the literal uses of paper that are intertwined with our lives, such as recording names in the Koran- She then goes onto to discuss how we are made from tissue (living tissue which is our skin) emphasising that life is fragile. Dharker has Pakistani origins & was raised in Glasgow. Many of her poems looks at issues of identity.
The Emigrée Carol Rumens 1993	The speaker speaks about a city that she left as a child. The speaker has a purely positive view of the city. The city she recalls has since changed, perhaps it was scene of conflict, however, she still protects the memory of her city. The city may not be a real place but represent a time, emotion - perhaps the speaker's childhood. According to Ben Wilkinson (critic), Rumens has a 'fascination with elsewhere.'
Kamikaze Beatrice Garland 2013	Kamikaze is the unofficial name given to Japanese pilots who were sent on a suicide mission. The mission was considered one of honour but this poem is about a pilot who aborted the mission. Hi daughter imagines that her father was reminded of his childhood & the beauty of nature & life whilst on the mission. When he returned home he was shunned.
Checking Out Me History John Agard 2007	The narrator discusses his identity & emphasises how identity is closely linked to history & understanding your own history. In school he was taught British history & not about his Caribbean roots to which he feels resentful . He mocks some of the pointless things he was taught & contrasts the nonsense topics with admirable black figures.

The Exam	Assessment Objectives
<p>Example question: Compare the ways poets present ideas about nature in 'Exposure' & in one other poem from the Power & Conflict cluster.</p> <p>INFO <input type="checkbox"/> 45 minutes <input type="checkbox"/> 1 task only- no choice of question <input type="checkbox"/> 1 poem printed</p>	<p>A01- Demonstrate an understanding of the question & poems, use quotations to evidence understanding. Ensure comparisons are made between poems & made throughout your response. <u>12 marks available</u></p> <p>A02- Carefully analyse the language used by the poet & comment on the intended effect on the reader. Ensure that you include subject terminology in your response. Comment where you can on structure/form <u>12 marks available</u></p> <p>A03- Show understanding of the relationships between poems & acknowledge the contexts (time) in which they were written & think about how this aids your understanding <u>6 marks available.</u></p>
<p>Actions: Step 1: Read & highlight the key words of question Step 2: Decide on one poem to compare to Step 3: Write quotes you want to use from your chosen poem & connect them to quotes from the printed poem. Step 4: Write the essay: intro/PEE on one poem – connective- PEE on next poem/ Repeat Step 6: Conclusion</p>	

Subject terminology
Alliteration Assonance Autobiographical Authentic Blank verse Caesura (plural caesurae) Colloquial language Dramatic monologue Emotive Enjambment Euphemism - <i>"all smiles stopped"</i> First person Form Free verse Half rhymes Iambic pentameter Imagery In medias res Internal rhyme <i>"tears between the bath and pre-lunch beers"</i> Irony Juxtaposition Metaphor Monologue Mood Narrative Onomatopoeia Anaphora Oxymoron Personification Sonnet Phonetic spellings Plosive Rhetoric Rhetorical question Rhyming scheme Rhyming couplet Rhythm Sibilance Simile Stanza Verse Structure Symbolism Volta Epic poem Cliché Hyperbole Semantic field Protagonist Poet Persona Chorus

Themes	
Power of Nature: Ozymandias, The Prelude, Exposure, Storm on the Island, Tissue & Kamikaze.	
Power of humans: Ozymandias, London, My Last Duchess, Tissue, Checking Out Me History.	
Effects of conflict: The Charge of the Light Brigade, Exposure, Bayonet Charge, Remains, Poppies, War Photographer, Kamikaze.	
Reality & brutality of conflict: The Charge of the Light Brigade, Exposure, Bayonet Charge, Remains, War Photographer.	
Loss & Absence: London, Exposure, Poppies, The Emigrée, Kamikaze.	
Memory: The Prelude, My last Duchess, Remains, Poppies, War Photographer, The Emigrée, Kamikaze.	
Place: London, The Prelude, The Emigrée, Kamikaze.	
Identity: My Last Duchess, The Charge of the Light Brigade, Poppies, Tissue, The Emigrée, Kamikaze, Checking Out Me History.	
Individual Experiences: London, The Prelude, Bayonet Charge, Remains, Poppies, War Photographer, The Emigrée, Kamikaze.	
Bravery: Exposure, Bayonet Charge, The Charge of the Light Brigade.	
Comparing Connectives	Contrasting connectives
Likewise In the same way Similarly Equally Likewise As with	However Whereas On the other hand Conversely Alternatively Although
Stretch yourself	
Be original, develop your own interpretations; Be critical, give your own justified opinions; Develop your ideas on context- what effect does have on the poem & your understanding?	

READING NON-FICTION

60 mins (25% GCSE) – Two non-fiction texts – one from 19th Century & one from 20th/21st century.

QUESTION ONE

CHOOSE four true or false statements from a list of 8.

- 4 marks = 5 mins (4 boxes shaded)
- Named lines
- AO1 – find & inference

BEFORE YOU BEGIN

LOOK AT THE SUMMARY INFORMATION ABOUT BOTH TEXTS – THEY GIVE YOU CLUES.
ALSO FIGURE OUT THE PAT/PAF/PAL OF BOTH TEXTS – THEY ALSO GIVE YOU CLUES.

- Only look at lines named in question to in order to find answers.
- Only shade 4 boxes (1 box = 1 mark) - this is not a trick question – it is easy.
- Follow the instruction on the paper if you shade the wrong box.

QUESTION TWO

Write a SUMMARY of the DIFFERENCES between Source A and B

- 8 marks = 10mins
- Two texts
- AO1 – summarise differences

- Read and highlight key words in the question
- Start mini essay with an overview sentence stating main difference then your summary of differences using short quotes and stating specific effects.
- E.g. “Firstly, the differences between Eddie and Henry are vast as Henry’s experience of school is much harsher than Eddie’s; we can see this when Henry complains about not being able to write freely as Mr. Smith, ‘would flog me if he knew it.’ This is contrast to...”
- Track through each text; space your quotes out throughout the whole text.

QUESTION THREE

How does the writer use LANGUAGE to...” in one source only

- 12 marks = 20 mins
- One text
- AO2 – Language (not structure)

- Read and highlight key words in the question
- Read and highlight text
- Start mini essay with an overview sentence, then answer the question using short quotes, naming the device and stating specific effects.
- E.g. “Henry uses lots of emotive language ... QUOTE..... in his letter to attempt to influence his father to remove him and his brother from Cotherstone Academy.”
- Analyse as many quotes as you can, analysing a technique used by the writer and discussing the multiple effects for the audience.
- Write a lot about a little - e.g. “The writer uses personification in this phrase, ‘Death stood at my bedside,’ to create an intense feeling of fear for the reader, suggesting the writer felt death was imminent; it was a threatening being, about to take his life.”
- Track through each text, space your quotes out throughout the whole text.

QUESTION FOUR

Compare DIFFERENCES in LANGUAGE in how the two writers present/convey/convince/persuade... in Source A and B

- 16marks = 25mins
- Two texts
- AO3 – compare language (not structure)

- Read and highlight key words in the question
- Start mini essay with an overview sentence stating the main difference in the language. E.g. The writer of Source A believes that education really is the job of parents and not schools, whereas the writer of Source B has sent both his boys off to a boarding school where he has little control and knows nothing about the conditions for his children, or the standard of education they are receiving.
- Then compare the differences in the writers’ viewpoints using short quotes and stating specific effects. E.g. For example, the writer of Source A explains using expert opinion ... QUOTE.....to demonstrate that..., however, the writer of Source B uses statistics QUOTE.....to back up their argument. The effect on the audience is similar as both add weight to the arguments the writers are putting forward and convince their audience of their standpoint.
- REFER TO BOTH WRITERS THROUGHOUT.
- YOU CAN REPEAT QUOTES & EFFECTS FROM EARLIER QUESTIONS.
- Go back and forth between the texts. Use comparison words or phrases = Likewise, Similarly, In the same way, Different to..., UnlikeB, In contrast.....,However, etc.

Mark Scheme

Bands 1-4	4 – DETAILED, PERCEPTIVE 3 - CLEAR, RELEVANT 2 - SOME, ATTEMPTS 1 – SIMPLE, LIMITED
Q2	<ul style="list-style-type: none"> • Perceptive inference and differences from both texts • Well-judged quotations
Q3	<ul style="list-style-type: none"> • Analyses the effects of writer’s choices • Well-judged quotations • Sophisticated subject terminology
Q4	<ul style="list-style-type: none"> • Same as Q2/3 AND... • Detailed understanding of different perspectives & ideas

RACES FOR CATS (Q3+4)

Rhetorical Questions
Adjective/Adverb
Contrast
Emotive Language
Statistics
Facts
Opinions
Repetition
Case Studies
Alliteration
Three (Power of)
Similes

Stretch yourself

Paradox/oxymoron
Irony
Onomatopoeia
Euphemism
Pun
Fronted adverbials or conjunctions
Simple/compound/complex sentences
Relative or conditional clauses
Noun/verb phrases
Writing for purpose/audience/type of text
Anaphora/epitrophe
Tone/Register
Narrative perspective

AOs

AO1	<ul style="list-style-type: none"> • Identify and interpret explicit and implicit information and ideas. • Select and synthesise evidence from different texts.
AO2	<ul style="list-style-type: none"> • Explain, comment on and analyse how writers use language and structure to achieve effects and influence readers • Use relevant subject terminology to support views.
AO3	<ul style="list-style-type: none"> • Compare writers’ ideas across two or more texts.