Knowledge Organisers

"I have come that they may have life and have it to the full"

John 10: 10

Year 11 - GCSE

You MUST bring this every day for every lesson. It must be placed on your desk at the start of each lesson.

look say cover write check

Knowledge Organisers at St John Fisher Catholic School

Why do we have Knowledge Organisers?

Knowledge Organisers show you the key information for that particular topic of study. It is the 'key take-aways' of what knowledge you will need to know to be successful in this topic. It will give you an excellent understanding of the topic you are studying and the expectations.

How do I use it?

Your teachers will use your knowledge organisers with you, explained in the section below, but you can also use it to support your understanding of the topic and develop further knowledge. You will have a test at the end of each unit of study and a PPE in the Summer term which will cover all that you have learnt therefore it is important that this new knowledge is embedded so that you can recall it later.

Use the Look, Say, Cover, Write, Check system to learn the information on your organisers. Complete any support/challenge tasks outlined. Research tells us that this method of practising is a good way to remember the knowledge. Over time, you will build up this knowledge and be able to recall it.

Use the Knowledge Organiser when completing class and homework especially with key vocabulary.

How will my teachers use it?

Your teachers may set homework to learn parts of the Knowledge Organiser or set tasks from what is on there. You will be expected to complete between 45-60 minutes of homework for each subject according to the homework timetable.

Your teachers will use the Knowledge Organiser in the lesson to support the new knowledge being taught so you must always keep this booklet with you and put on your desk at the start of each lesson.

You may be given low stake quizzes in your lessons which will test your recall of the current knowledge but also previous knowledge as the year progresses.

What do I do if I lose it?

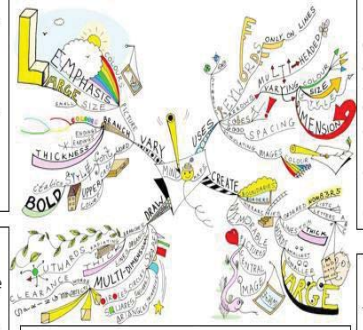
All Knowledge Organisers are on the school website. However, you can purchase a copy at student services if you lose this.

GCSE Art

Mind Mapping – Ideas presented around the theme of the work

Central idea.
This is the starting point of your Mind Map and represents the topic you are going to explore.
Your central idea should be in the centre of your page and should include an image that represents the Mind Map's topic.

Branches.
The main branches which flow from the central image are the key themes. You can explore each theme or main branch in greater depth by adding smaller branches.



Key words.
When you add a branch to your Mind Map, you will need to include a key idea. An important principle of Mind Mapping is using **one word per branch**. Keeping to one word sparks off a greater number of associations compared to using multiple words or phrases.

Colour coding.
This links the visual with the logical and helps your brain to create mental shortcuts. The code allows you to categorise, highlight and analyse information. Colours also make images more appealing and engaging.

Include images.
Images have the power to convey much more information than a word or sentence. They are processed instantly by the brain and act as visual stimuli to recall information.

Moodboard – A collage of ideas using collected images

Consider your theme.
Do you want it quite narrow or are you happy to collect a wider range of ideas.

Use a range of sources.
Internet images, photographs, wallpaper/fabric samples, lettering.

Don't limit yourself.
Even if it doesn't directly link to your starting point it may relate to the theme. Consider colours and words to help you.

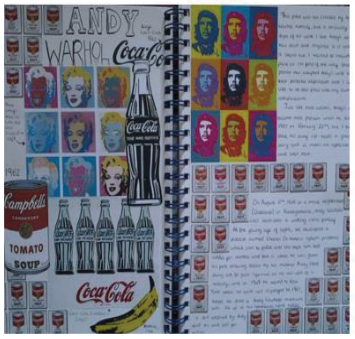
Apply your ideas.
Your moodboard will directly link to the development of your project. If there is empty space fill it with sketches or annotations.

Pick a style.
Pulling it all together with a colour theme or visual style will make your page work together as a whole.

Artist Research – showing your understanding of an artists work or style

Biographical information.
Birth, death, style, education, important works

Social, historical and economic influences.
What was happening at the time? Were they responding to anything that was happening around them?



Technical information.
How was their produced? What methods and materials did they use?

Artistic influences.
Who influenced their work? Did their work influence anyone else?

Collected images.
Select images that are relevant and that appeal to you, make comments about why you like them

Copied images.
Show your understanding by reproducing examples of their work

Presentation.
Must be A3 or 2 A4 sheet, include a clear title and relevant background

Analysing Art Work

Content – Looking at the subject of the work.
What is it? What exactly can you see? What is happening? What does the work represent?
What does the artist call the work?
Does the title change the way we see the work?
What is the theme of the work?
Landscape, portrait, journey, moment, memory, event, surreal, fantasy, abstract, message.

Form – Looking at the formal elements.
What colours does the artist use? Why? How is the colour organised?
What kind of shapes can you see?
What kinds of lines and marks does the artist use?
What is the surface like? What textures can you see?
What patterns can you see?
How big is the work?
Light, delicate, layered, strong, rough, dark, peaceful, dripped, textured, scale, vivid, bright.

Process – How the work has been developed and made.
What materials and tools have been used?
What is the evidence for how it has been made?
Painted, drawn, woven, printed, cast, stitched, constructed, collaged.

Mood – Looking at the communication of moods and feelings.
How does the work make you feel?
Why do you feel like this?
Does the colour, texture, form or theme of the work affect your mood?
Quiet, contemplative, thoughtful, hopeful, peaceful, elated, joyful, reflective.

Assessment Objective 1: Contextual Understanding – Develop ideas through investigations, demonstrating critical understanding of sources

GCSE Art

Assessment Objective 2: Creative Making –refine work by exploring ideas and experimenting with appropriate media, materials, techniques and processes

Pencil		The basic tool for drawing, can be used for linear work or for shading
Biro		Drawings can be completed in biro and shaded using hatching or cross hatching
Pastel (chalk/oil)		Oil and chalk pastels can be used to blend colours smoothly, chalk pastels give a lighter effect
Coloured pencil		Coloured pencil can be layered to blend colours, some are water soluble
Acrylic paint		A thick heavy paint that can be used smoothly or to create texture
Watercolour		A solid or liquid paint that is to be used watered down and layered
Gouache		A pure pigment paint that can be used like watercolours or more thickly for an opaque effect
Pressprint		A polystyrene sheet that can be drawn into to print white lines – can be used as more than 1 layer
Monoprint		Where ink is transferred onto paper by drawing over a prepared surface
Collograph		A printing plate constructed of collaged materials
Card construction		Sculptures created by building up layers of card or fitting together
Wire		Thick or thin wire manipulated to create 2d or 3d forms
Clay		A soft substance used for sculpting, when fired can be glazed to create shiny colourful surfaces
Batik		A fabric technique using hot wax to resist coloured inks
Silk painting		Fabric inks painted onto silk, Gutta can be used as an outliner to prevent colours mixing

Media	The substance that an artist use to make art.
Materials	The same as media but can also refer to the basis of the art work eg, canvas, paper, clay.
Techniques	The method used to complete the art work, can be generic such as painting or more focus such as blending.
Processes	The method used to create artwork that usually follows a range of steps rather than just one skill.

Colour Theory

Primary= RED, YELLOW, BLUE	Complimentary; Colours opposite on the colour wheel
Secondary= Primary+Primary	Harmonious; Colours next to each other on the wheel
Tertiary= Secondary+Primary	Monochromatic; shades, tones & tints of one colour
Shades –add black	Hue –the pigment
Tint –add white	Warm; RED, ORANGE YELLOW. Cold; BLUE, GREEN, PURPLE

GCSE Art

Methods of Recording

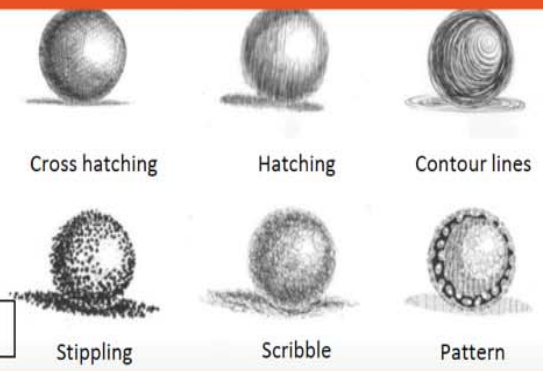
Observational drawing	Drawing from looking at images or objects
First hand observation	Drawing directly from looking at objects in front of you
Second hand observation	Drawing from looking at images of objects
Photographs	Using a camera or smartphone to record images will class as first hand observation
Sketches	Basic sketches and doodles can act as a starting point for development

Stages of Drawing

Basic Shapes → Accurate Shapes → Detail → Shade

Tonal shade
Produce a range of tones by varying the pressure and layering – consider using softer pencils for darker shades

Alternative shade techniques



Annotation

Describes writing notes, using images and explaining your thoughts to show the development of your work.

Step 1: Describe
What is this an image of?
What have you done here?
What was this stage od the project for?

Step 2: Explain
How was this work made?
How did you produce particular effects?
How did you decide on the composition?

Step 3: Reflect
Why did you use these specific methods?
Why do particular parts work better than others?
Why might you do things differently next time?

Assessment Objective 3: Reflective Recording –Record ideas, observations and insights relevant to intentions as work progresses

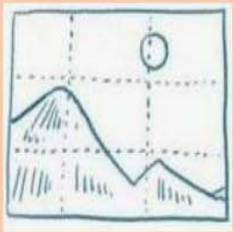
GCSE Art

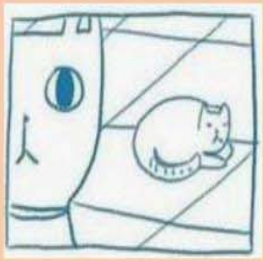
The Formal Elements

LINE	the path left by a moving point, e.g. a pencil or a brush dipped in paint. It can take many forms. e.g. horizontal, diagonal or curved.
TONE	means the lightness or darkness of something. This could be a shade or how dark or light a colour appears
TEXTURE	the surface quality of something, the way something feels or looks like it feels. There are two types : Actual and Visual
SHAPE	an area enclosed by a line. It could be just an outline or it could be shaded in.
PATTERN	a design that is created by repeating lines, shapes, tones or colours. can be manmade, like a design on fabric, or natural, such as the markings on animal fur.
COLOUR	There are 2 types including Primary and Secondary . By mixing any two Primary together we get a Secondary

A Rough	A Visual/ Maquette	Final Piece
A basic sketch of a final idea	A small image or model created in selected materials	An image or sculpture pulling all preparatory work together

Rule of thirds – Place focal objects at 1/3 or 2/3 of the image horizontally or vertically. Not in the middle





Balance elements. If there is an emphasis on one side balance it out with smaller objects on the other

Simplify and fill. Enlarge or crop the image to fill the space

Use lines. Lines will draw the viewer in, they don't have to be straight, consider S or C

Assessment Objective 4: Personal Presentation: Present a personal and meaningful response that realises intentions and demonstrates understanding of visual language.

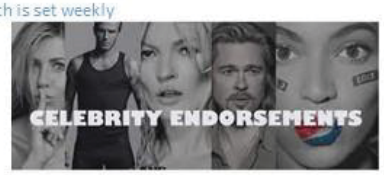
Year 11 Enterprise and Marketing Knowledge Organiser (R069)

AIM: This term we will learn cost analysis and pricing, then analyse the cost of a given case study to understand financial viability of a project.

Assessment: Coursework and homework which is set weekly

Branding

- Brand name
- Logo
- Sound / jingle
- Strapline
- Characters
- Celebrity endorsement



Objective of Promotional Campaign

Consideration for Pitch

Venue
Audience
Pitch Objectives
Materials

Pitch Presentation Skills

To raise awareness of a product or service
To differentiate □ To create market presence
To increase market share

Verbal skills

- Clarity
- Tone of voice
- Voice projection
- Formal / informal language
- Speaking pace

Non-verbal skills

- Posture
- Eye contact
- Confidence
- Gestures
- Persuasiveness

Use of notes / cues / pitch script
Time management

Factors to consider

Let us examine each of the following in turn because they all have an important bearing on the presentation.

- Your voice.
- Your use of eye contact.
- Your positioning.
- The use of body language.
- Involving hand/ face/ whole body gestures.
- Your overall appearance.

Peer Feedback

KEY SKILLS: Research, I.T, Presentation, Communication, Teamwork
Analytical, Creativity, and Evaluative skills

Computer Networks

A network is a set of computers that are connected to one another.
Standalone computers are isolated from other devices.

Advantages of a network

- ✓ Share resources, such as software applications, files and
- ✓ hardware (eg printers).
- ✓ Allows communication (eg email) and can transfer files easily.
- ✓ Easier network management (eg can backup data onto a central fileserver; updates can be sent to all computers; users on a network can login to any computer)

Disadvantages of a network

- ✓ Greater security risk as computers can be hacked if they are connected to the internet.
- ✓ Worms can spread from one computer to another
- ✓ A problem with any shared resource, (eg file server goes down) can impact the whole network.

Types of Computer Networks

Personal Area Network (PAN) set up around an individual person. Many people have multiple devices such as tablets, phones and computers that can be interconnected using a PAN. A Bluetooth PAN uses radio waves to communicate wirelessly between devices over a range of a few metres.

Local Area Network (LAN) covers a relatively small geographical area typically extends over the range of a single organisation such as a university campus, school site. LANs are usually managed by a single organisation.

Wide Area Network (WAN) made up of many local area networks and covers a much wider geographical area. The internet the ultimate WAN. It is a network of networks with billions of interconnected devices. No single person or organisation has control over a WAN.

Network Topology

A network topology describes how a set of computers are arranged within a network.

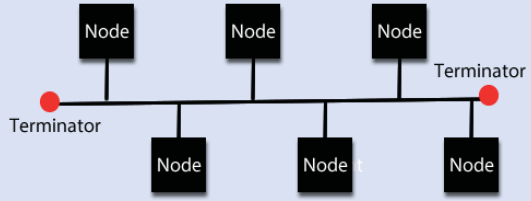
Bus network topology All devices including clients, servers, printers and so on are connected to a cable called a bus. All communication is via the shared bus. At either ends of the bus is a terminator.

Advantages

- ✓ Easy and cheap to install and does not require much cable
- ✓ Easy to add more computers

Disadvantages

- ✓ If the main cable fails then then the whole network fails.
- ✓ Less secure as data are broadcast to all devices on the network.
- ✓ Can be slow as there are collisions between data along the shared bus.
- ✓ Will get slower as more computers are added.



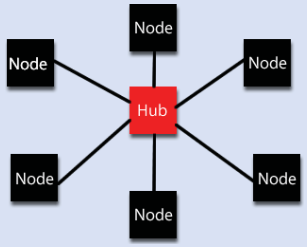
Star network topology all devices including clients, servers, printers and so on are connected to a central hub or switch. All communication is via the hub

Advantages

- ✓ Greater security as data are only sent to the intended recipient.
- ✓ If any of the connections fail only a single node will be affected.
- ✓ Fewer collisions between data packets

Disadvantages

- ✓ If the central hub fails then every computer on the network is affected.
- ✓ Expensive as extra cable and hardware (hubs) are needed.



Wired and Wireless

Computers can be connected using wired or wireless methods
Wired transmission methods use cables to communicate
Wireless transmission use radio waves communicate (eg Wi-Fi).

Advantages of wireless

- ✓ Can use computer anywhere and not constrained by cables

Disadvantages of wireless

- ✓ Packets can be intercepted more easily than wired connections
- ✓ Security is a much more difficult challenge, as the network can be accessed from outside the confines of a building.
- ✓ Slower than wired methods
- ✓ Signal can be interfered with by other electronic devices.

Advantages of wired

- ✓ Allows more control, security and reliability. Can restrict who has access to the network.
- ✓ Wired methods have greater speeds than wireless methods.

Disadvantages of wired

- ✓ Cables can be difficult to maintain in big organisations

Wired networks use a variety of cables, including copper and fibre optic.

Copper cables use electrical signals to transmit data. Three main types:

- ✓ **Coaxial cable** – the signal loses strength over long distances
- ✓ **Unshielded twisted pair** – A pair of copper cables are twisted together and allows data to be transmitted over longer distances
- ✓ **Shielded twisted pair** – Shielding around the twisted cables means the signal is less susceptible to interference.

Fibre optic cables are glass or plastic and use use pulses of light to transmit data

Advantages of copper cables

- ✓ Cheaper than fibre optic
- ✓ Reliable because a telephone is powered from the copper cable and does not rely on a separate electrical power supply

Advantages of copper cables

- ✓ Slow
- ✓ Low capacity
- ✓ Can only be used over short distances
- ✓ Interference can occur

Advantages of fibre optic

- ✓ Higher bandwidth than copper so can transmit more data
- ✓ Less attenuation (degrading) of the signal so fibre optic is more suitable over long distances
- ✓ Less "cross talk" interference between fibres compared with copper so the quality of the signal is better

Disadvantages of fibre optic

- ✓ Expensive
- ✓ Difficult to install

Network Security and Protocols

Why do we need network security?

- ✓ To prevent unauthorised access to our electronic devices
- ✓ To protect our data eg to prevent sensitive data being stolen
- ✓ Prevent cyberattacks

Methods of Network Security

Authentication allows us to confirm the identity an individual.
There are lots of ways of confirming the identity of an individual that come under one of three factors:

- ✓ Knowledge factor: Something the user knows, eg a password

- ✓ Possession factor: Something the user owns eg a mobile phone
- ✓ Biometric factor: eg Fingerprint, iris scan

Encryption The message is garbled so if it gets intercepted during transmission it will be almost impossible for anyone without the key to read the original message.

Firewall prevents packets containing malware getting on to the computer

MAC address filtering A MAC (Media Access Control) address is a unique identifier for any device that is connected to a network. Each network interface card has a unique MAC address that is a 12 digit hexadecimal code (e.g. 12-F3-EE-56-44-A1).

- ✓ *White list filtering* only allows devices on a list to connect to the network.
- ✓ *Black list filtering* devices in a black list blocked from accessing the network.

Network Protocols

A **network protocol** is a set of rules that allow computers to communicate and exchange information over a network. There are many types of protocols depending on the application.

HTTP (Hypertext transfer protocol) is the protocol used for the World Wide Web. An exchange begins with a request for a web page from a client web browser to a web server. The server then sends the web page to the client.

HTTPS (Secure Hypertext transfer protocol) is a secure way of transferring data between a web browser and a server because the data are encrypted during transfer. Used for e-commerce and online banking.

FTP (File Transfer Protocol) is usually used to download or upload large files from a server to a client.

Ethernet is not a single protocol but a collection of related protocols. LANs most commonly use ethernet. The following is a simplified procedure:

1) Check whether there is any traffic on the ethernet
2) If so wait for traffic to clear
3) Send the packet
4) If collision detected, go to step 1 to resend.

Wi-Fi is a collection of protocol that use radio waves to transmit data between devices. Wi-Fi is a trademark and WLAN (Wireless LAN) is the generic term. Data are transmitted when the medium is clear, and an acknowledgement is received if the transmission was successful. If no acknowledgement is received, then the data are resent as it is assumed that a collision occurred, and the packets did not reach their destination.

Email protocols

SMTP (simple mail transfer protocol) Sends the mail from the user onto the mail server.

IMAP (Internet Message Access Protocol) Retrieves the mail from the mail server to the client (user) and allows access from anywhere on any device because the email remains on the server.

TCP (Transport Control Protocol) When files are sent over the internet they are broken up into small chunks called packets. When they arrive at the destination computer they are reassembled back into the original format. TCP handles and controls all this. TCP waits for acknowledgements to verify whether the packets have reached their destination. TCP will also retransmit packets of they have not arrived at the destination or become corrupted.

IP (Internet Protocol) The internet protocol is a set of rules that govern the transmission of data across the internet.

UDP (User Datagram Protocol) is used as an alternative to TCP. It is used in video conferencing and online gaming when speed is necessary as huge volumes of data are transferred in real time. It improves speed by not checking for lost packets so they do not get re-sent.

TCP/IP

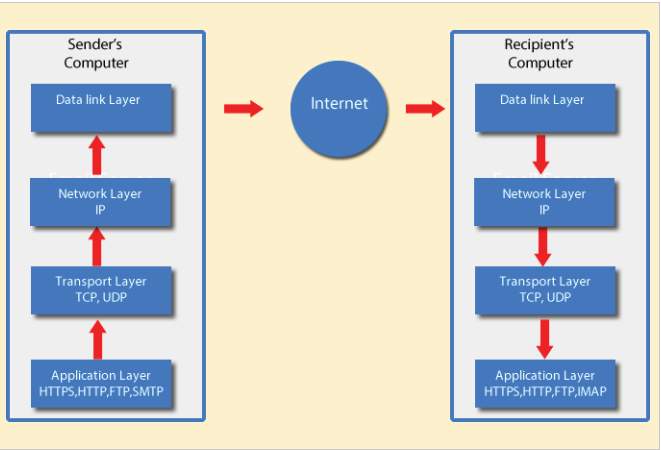
The TCP and IP protocol work closely together and are referred to as TCP/IP. The TCP/IP model consists of four layers that pass data between each layer.

Application layer contains protocols related to the application such as HTTP, HTTPS for web browsers, FTP for file transfer and SMTP and IMAP for email. The application layer interacts with the user via appropriate application software (eg web browser / ftp client).

The **transport layer** establishes the end to end connection. When files are sent over the internet, they are broken up into small chunks called packets. When they arrive at the destination computer they are reassembled back into the original format. It is the role of the transport layer to split the data into packets and pass the data onto the network layer. On the recipient's computer the transport layer reassembles the packets into the original form. The packets are numbered by this layer to allow them to the reassembled. The transport layer chooses the port number for sender and receiver. TCP and UDP are the main protocols used in this layer.

The **network layer** adds the source and destination IP address and route the packets over the network. At the destination the network layer strips out the IP addresses. The IP operates on this layer.

The **data link layer** has a network card and deals with the physical connection and adds the physical addresses (MAC address) of the hardware to the packets that it receives from the network layer. For each step the sender and receiver MAC address is removed then a new sender and receiver MAC address is added. The receiver MAC address becomes the sender MAC address.



State **two** advantages of using a star topology instead of a bus topology.

[2 marks]

1 _____

_____

2 _____

_____

State **one** disadvantage of using a star topology instead of a bus topology.

[1 mark]

_____

_____

Discuss the benefits and risks of using a computer network.

[9 marks]

_____

Computer Systems

A computer system has both hardware and software.
Hardware are the physical components that make up a device or computer system.
Software is the computer code, programs and algorithms that give instructions to the hardware to make it perform the desired task.

Software Classification

Software is split into two types: application software and system software
Application software is a program designed to perform a specific task that the user interacts directly with (eg spreadsheets, web browser and word processor).
System software is concerned with the running of the computer. Its purpose is the control the computer hardware and manage the application software. (eg operating system, antivirus, backup tools, firewall)
The **operating system (OS)** is the most important piece of system software. The OS handles management of the processor, memory, input/output devices, applications and security.

- **Application management**
- **Processor resources**
- **Memory management**
- **Security**
- **Input / Output devices**

Cloud Computing

- Can store data and files on a server elsewhere that can be accesses via the internet.
- Can use applications over the internet
- Can sync files so that all your devices see the same files
- Can share documents with others
- Can access your files anywhere if you have a good internet connection

Advantages of cloud computing

- Only pay for storage that you use
- Data and files available from anywhere in the world where there is an internet connection
- Data automatically backed up

Disadvantages of cloud computing

- Need a reliable network connection
- Files are hosted elsewhere so a security concern
- the most recent versions of software is often not available
- Transfer of data over the internet will slow down performance.

Advantages of local storage

- Files can be accessed even when there is no internet connection
- More secure as files to not need to be transferred over the network and the user has more control

Disadvantages of local storage

- Users need to organise their backup solutions
- Not so easy to share documents
- Can only access the files locally

Memory

Volatile memory (main memory) When the computer is turned off the contents of volatile memory is lost. When there is no power, volatile memory is erased.
Non-volatile memory (secondary storage) Even when here is no power, the data remain unchanged and can be accessed once again once power has been resumed. This allows you to store files for he long term.
ROM (Read Only Memory) Data can only be read from the device, and cannot the memory cannot be edited or deleted. ROM is only used for situations where you can be sure that updates will not be needed. The computer's BIOS (basic input output system) which controls the boot up sequence is stored on a ROM chip.
RAM (Random Access Memory) - When applications are executed they are loaded into RAM first. RAM is volatile.

Embedded Systems

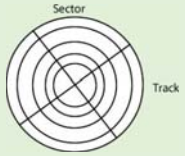
An embedded system is a computer system that is designed for a specific function, in contrast to a general-purpose computer that can carry out many tasks. Embedded systems typically have a minimal or no user interface. They can be optimised for size and power consumption, for instance. Examples of embedded systems include digital watches, MP3 players, washing machines, cars and mobile phones.

Secondary Storage

Secondary storage is necessary for saving files long and software including the operating system. Even when the computer is turned off, the data remain unchanged, and can be accessed again once the power supply has been turned on.

Magnetic Hard Disk

- Tracks on the disk platters contain tiny magnets, each holding 1 bit of data.
- The polarity (negative or positive) of the magnets determines whether the bits are 0 or 1.
- The write head modifies the polarity of the magnet as appropriate.
- The read head identifies whether each magnet is negative or positive.
- The tracks are laid out as a series of concentric rings.



Advantages

- Cheap form of storage

Disadvantages

- Less reliable because it contains moving parts that can break
- Electromagnetic surge can corrupt the data held
- Slow speed of read/write access

Optical Disks

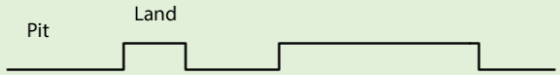
- Tracks on the disk contain pits and lands.
- The track is a spiral.
- A laser is emitted and the laser light is reflected when it hits the lands, but is scattered when it hits the pits.
- Depending on whether the light is scattered light is encoded as a binary value of 0 and reflected light is encoded as a 1.
- The sensor is able to detect light reflected, but not scattered.
- Example: Blue-Ray (25 Gb) DVD (4.7 Gb), CD (700 Mb).

Advantages

- Can transfer easily between computers

Disadvantages

- Can scratch easily
- Not much storage compared with other methods.
- No unlimited writes to the hard disk



Solid state Drive

- Use millions of switches called floating gate transistors on microchips to store data.
- Electrons are stored in gates and this is encoded as 0 when there is an electron present and encoded a 1 when there is no electron present.
- The electros remain trapped even when there is no flow of electricity.
- Contain no moving parts and are therefore more robust that optical and magnetic storage.

Advantages

- Much faster that other means of storage
- More reliable than other means if you are only reading
- Quiet

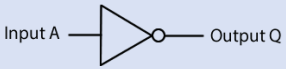
Disadvantages

- More expensive per volume of storage
- Reliability might be an issue if you do a lot of writing

Boolean Logic

NOT gate - The output is the opposite of the input

$$Q = \bar{A}$$
$$Q = NOT\ A$$

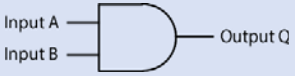


NOT truth table

Input	Output
0	1
1	0

AND gate - has two inputs and will have a true output if the two inputs are true otherwise the output will be false

$$Q = A.B$$
$$Q = A\ AND\ B$$

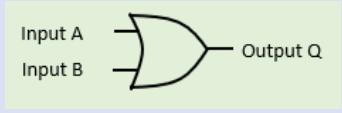


AND truth table

Input - A	Input - B	Output
0	0	0
1	0	0
0	1	0
1	1	1

OR gate - has two inputs and will have a true output if either or both the inputs are true

$$Q = A + B$$
$$Q = A\ OR\ B$$

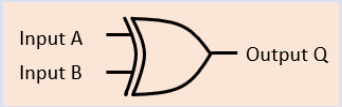


OR truth table

Input - A	Input - B	Output
0	0	0
1	0	1
0	1	1
1	1	1

XOR gate - has two inputs and will have a true output if either the inputs are true but not both

$$Q = A \oplus B$$
$$Q = A\ XOR\ B$$



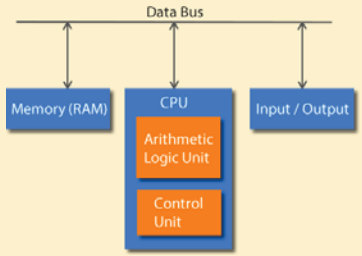
OR truth table

Input A	Input B	Output
0	0	0
1	0	1
0	1	1
1	1	0

System Architecture

CPU (Computer Processing Unit) or processor Fetches, decodes and executes instructions and performs logical and arithmetic operations.

Von Neumann architecture is the stored program concept, where program instructions and the data to be processed can be stored in the same memory.



Components of a CPU

Bus Wires through which data and instructions are transferred between computer components

Clock keeps all the CPU components synchronised

Arithmetic Logic Unit (ALU) Every operation takes place here. This is where the arithmetic (eg adding two binary numbers) and logic operations (eg checking to see if one number is bigger than another) take place.

Control Unit Decode the machine code instruction so that the ALU knows what to do with the instruction. Controls and monitors data transfer between different input and output hardware components

Factors affecting CPU performance

Clock speed is the number of cycles that a processor carries out per second. Each cycle of the CPU allows a single action (instruction) to be carried out. The greater the clock speed, the greater the number of operations and the faster the computer will run.

Number of processor cores A core is CPU in its own right. Nowadays most CPUs have multiple cores. Having multiple cores allows instructions to be carried out concurrently (at the same time), whereas a single core will only allow carry out instructions in serial (one at a time).

Cache size Cache is a volatile memory store on the processor. Cache is much faster but smaller that RAM. Frequently used data and instructions within an application can be stored in cache instead of fetching from RAM which is quite slow. The bigger the cache the greater the volume of data and instructions that can be stored thereby reducing latency and improving performance of the CPU.

Fetch execute cycle

1. Instructions are loaded into memory
2. Processor fetches the instruction from the main memory
3. Instruction is decoded so the CPU knows what to do with the instruction
4. Processor then executes the instruction
5. Result of the instruction can be stored in memory
6. Next instruction is then fetched from main memory and the cycle repeats itself.

Classification of programming languages

High level programming languages are closer to human language and is therefore easier to understand.

Low level programming languages refer to machine code and assembly language.

Machine code is expressed in binary values 0 and 1. This is the language that computers understand.

Assembly language provides basic computer instructions for programs to run. There is a one to one relationship between machine code and assembly code instructions.

Program translators allow programs to be translated into machine code so the than programs can be run on a computer.

Interpreter converts high level languages into machine code one instruction at a time. The machine code is not saved.

Compiler A program that converts high level languages into machine code before the program is run. A compiler saves the machine code, so the source code is no longer needed.

Assembler converts assembly language instructions into machine code.

Creative i-Media R095 part 2

Each Frame Tells Part of the Story

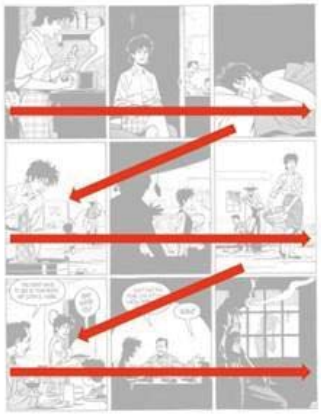
What we are Learning This Term

R095 Characters and Comics

In this unit you will learn how to create your characters and comic book, and critically review it with improvements that you could have done

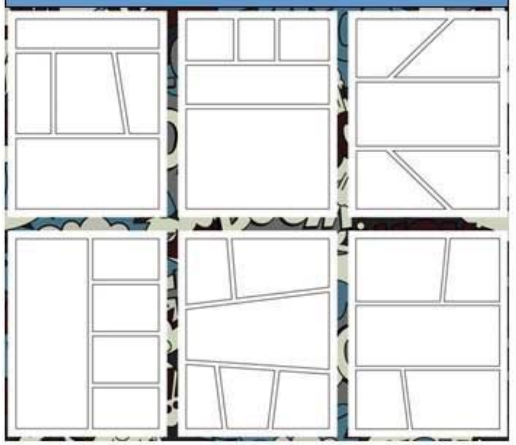
- Comic layout
- Create characters & assets for use as components within comics
- Integrate the script/story flow using speech & thought bubbles, narration and captions
- MS Publisher

Page Flow

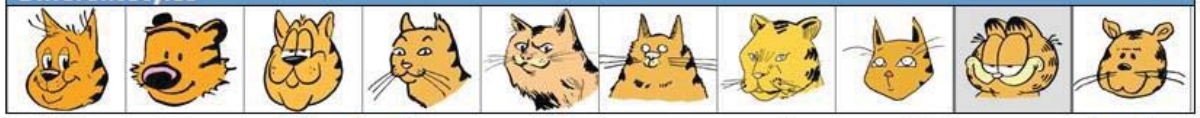


Photopea

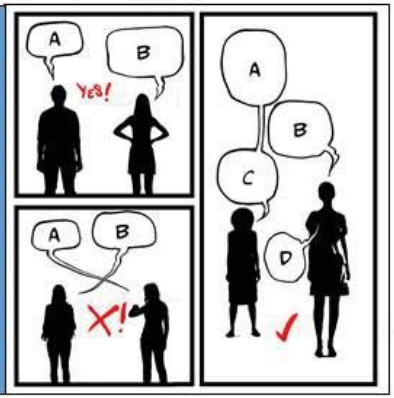
Page Layouts



Different Styles



Multi-person Conversations



Thought Bubbles

Speech Bubbles

onomatopoeia

NEA

Section A: Identifying and investigating design possibilities (10 marks)
Look at the challenge and:
- Identify possibilities
- Investigate client needs and wants
- Look at economic and social challenges
- Research work of others

Make sure you use primary and secondary research.
Make sure all your research relates to your challenge.

Section B: Producing a design brief and specification (10 marks)
Use your investigations to outline design possibilities.
Make sure you have a design brief and design specification

Section C: Generating design ideas (20 marks)
Explore a range of ideas linking to your challenge.
Make sure you are being original and creative in your ideas.
Be imaginative and experiment with different ideas.
Remember to be innovative and different to others.

Section D: Developing design ideas (20 marks)
You will use formal and informal drawing using CAD, schematic diagrams, models and schedules.
You need at least one suitable model.
You will select suitable materials and components.
Make sure you keep reflecting on how ideas meat requirements and design specification.
Remember to include enough information for third party manufacture.

Section E: Realising design ideas (20 marks)
You will work with a range of materials and components to make prototypes.
You will use specialist tools and equipment.
The prototypes will be constructed through a range of techniques, which may involve shaping, fabrication, construction and assembly.
The prototypes will have suitable finish with functional and aesthetic qualities, where appropriate.

Section F: Analysing and evaluating (20 marks)
All through the project you will analyse and evaluate your work.
This includes:
- Define requirements
- Analysing the design brief and specifications
- Testing
- Evaluating ideas

Ther final prototype(s) will also undergo a range of tests on which the final evaluation will be formulated. This should include market testing and a detailed analysis of the prototype(s).

Year 11 TERM 1

Food – Sensory Science

Using our senses

A range of senses are used when eating food:

- sight;
- smell;
- hearing;
- taste;
- touch.

A combination of these senses helps to evaluate a food.

Appearance

The size, shape, colour, temperature and surface texture all play an important part in helping to determine first reactions to a food.

Taste

There are five basic tastes:

- bitter;
- salt;
- sour;
- sweet;
- umami.

Smell (odour or aroma)

The nose detects volatile aromas released from food. An odour may be described by association with a particular food, e.g. herby, cheesy, fishy.

The intensity can also be recorded. Odour and taste work together to produce flavour.

Touch

Food texture is the way food is felt by the fingertips, tongue, teeth and palate. When food is placed in the mouth, the surface of the tongue and other sensitive skin reacts to its surface texture. This sensation is known as mouthfeel.

Hearing (sound)

The sounds of food being prepared, cooked, served and eaten all help to influence our preferences. The sound of eating food can alter our perception of how fresh a food is, e.g. crunchy carrots.

Tasting vocabulary (sensory attributes)

Sight	Bubbling	Flaky	Opaque
	Caramelised	Firm	Smooth
	Clear	Heavy	Solid
	Coarse	Icy	Steaming
	Crumbly	Juicy	Sticky
	Dry	Moist	Thick
Smell	Acidic	Fresh	Spicy
	Aromatic	Meaty	Strong
	Bland	Mild	Sweet
	Citrus	Pungent	Tart
	Earthy	Savoury	Weak
	Fragrant	Smoky	Zesty
Sound	Brittle	Crisp	Pop
	Crackle	Crunch	Sizzle
Taste	Bitter	Rich	Strong
	Bland	Salty	Sweet
	Floury	Savoury	Tangy
	Hot	Smoky	Tart
	Mild	Sour	Umami
	Piquant	Spicy	Zesty
Touch	Brittle	Dry	Short
	Bubbly	Gooey	Soft
	Chewy	Granular	Solid
	Close	Greasy	Tacky
	Cloying	Moist	Tender
	Coarse	Open	Waxy

Sensory evaluation and tests

Sensory evaluation analyses and measures human responses to food and drink, e.g. appearance, touch, odour, texture, temperature and taste. In order to obtain reliable results, sensory evaluation tests should be set up in a controlled way to ensure fair testing, e.g. no distracting colours, noise or smells; same size portions; coded samples, and water to drink.

Preference tests - these types of tests supply information about people's likes and dislikes of a product. They are not intended to evaluate specific characteristics, such as crunchiness or smoothness. They are subjective tests and include hedonic, paired comparison and scoring.

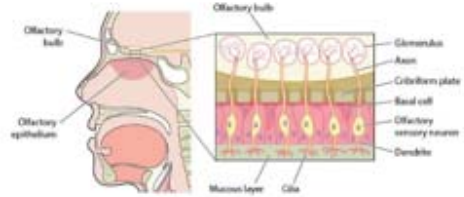
Discrimination tests - these types of tests aim to evaluate specific attributes, i.e. characteristics of products (crunchiness). They are objective tests and include triangle, duo trio, ranking and paired comparison.

Taste receptors

Our tongues are covered with taste buds, which are designed to sense chemicals in the mouth. Most taste buds are located in the top outer edges of the tongue, but there are also receptors at the back of the tongue as well as on the walls of the mouth and at the back of the throat. As we chew food, molecules mix with saliva, enter taste pores and interact with gustatory hairs, also known as taste receptors. This triggers nerve impulses that are transmitted to the brain.

Olfactory system

This is the sensory system used for olfaction, or the sense of smell. As we breathe in, the olfactory receptor cells are stimulated by odours and the olfactory membrane sends neural messages up the olfactory nerve to the brain.



Key terms

Fair testing: Ensuring that sensory tests obtain reliable results.
Food texture: The way food is felt by the fingertips, tongue, teeth and palate.
Olfactory system: The sensory system used for olfaction, or the sense of smell.
Senses: Sight, smell, hearing, taste and touch are all used when eating food and drink.
Sensory attributes: Words used to describe the appearance, odour, taste and texture of a food product
Sensory evaluation: Analyses and measures human responses to food and drink.

Intensity

Foods may be described by association, e.g. meaty, minty or fruity.

The intensity (low, medium or high) can also be recorded, e.g. garlicky or salty.

Tasks

1. Write a guide to conducting sensory evaluation tests that are fair and reliable.
2. Research umami and make a dish that is rich in the taste of umami.

To find out more, go to:
https://bit.ly/2Bzsgq5

Geography - Year 11 Term 1 – Water Resources

To know how environments are changed by exploitation.

Deforestation in Cameroon – Palm oil is used in food stuffs and soaps. 1% of rainforest is cleared each year for timber extraction and palm oil plantations. This has affected biodiversity (chimps, gorillas and forest elephants) and causes soil erosion (loss of soil, pollution of water supplies and impact on infrastructure and fishing).

Oil Extraction in Ecuador – 1960's oil discovered in the Amazon rainforest home to indigenous, subsistence tribes. Oil extraction caused spillages from pipes and waste pits and pollution, resulting in damage to local rivers which support the tribes, providing water for drinking, cooking, bathing and fishing.

Overfishing in the North Sea – Many Europeans rely on fish for protein and the sea was thought to be inexhaustible. In last 50 years, fish finding sonar, bigger boats and nets meant more fish were caught. Became unsustainable and overfished - resulting in less fish being caught and quotas being put in place.

To know the distribution of natural resources in the UK and globally.

UK UK geology has shaped the distribution of minerals. Metals with igneous and coal, gas and oil with sedimentary rocks. Much of the land was once woodland but now only 12% mainly in north and west. 75% of the land is farmed with pasture in the NW and arable in the SE (climate and relief). Water is plentiful but some spatial and temporal imbalance.

Global Uneven. Mineral pattern matches types of rock, with rare and valuable metals found with volcanic activity and energy found with sedimentary rocks. Main oil reserves are in the Middle East. Big variations in vegetation and soils resulting from climatic differences, mean farming only covers 40% of land. 30% is still forested although this was 55%.

To know definitions and classifications of natural resources.

Abiotic Resources Obtained from the lithosphere, atmosphere and hydrosphere. Examples are minerals, soil, sunlight, rainfall and fresh water.

Biotic Resources Obtained from the biosphere and capable of reproduction. Examples are animals, plants, birds and fungi.

Non-Renewable Resources Are those that cannot be remade because it would take millions of years for them to form. Examples are coal, oil, uranium and natural gas.

Renewable Resources Are those that are potentially inexhaustible and can be naturally replenished in a short timescale. Examples are wind, solar and hydro-electric.

To know why some parts of the world have a water surplus or deficit.

Whether a place has a water surplus or deficit depends on the balance between the water it receives from precipitation and the water it loses through evaporation and transpiration. Many places have a rough balance between the two. Some parts of the world receive more than they lose – meaning they have a surplus. Other places have high rates of evaporation and transpiration and they can lose more water than they receive- a deficit.

To know the proportions of water used by industry, agriculture and domestic sectors in developed and developing countries.

	World %	Developed %	Developing %
Agriculture	70	30	82
Industry	22	59	10
Domestic	8	11	8

To know the global, national and local distribution of fresh water.

All distribution is uneven because of the amount of rainfall places receive and the rate at which water is lost through evaporation and transpiration. Many places have a rough balance between the two, but some parts of the world, such as rainforests and mountains, receive more than they lose, resulting in a surplus. Others, however, such as North Africa, receive little rainfall and have high rates of evaporation and transpiration, meaning a deficit.

Similarly, in the UK, the north and west receives more rainfall due to prevailing wind direction (brings rain) and relief. In this area temperatures are also lower, resulting in less evaporation and transpiration than in the south and east.

To know the global pattern of food, energy and water consumption.

People in developed countries use ten times more natural resources than those in developing countries. The rapid growth in the world's population, increased economic development and rising standards of living in countries such as China, India and Brazil all increase consumption.

Global Energy Consumption is influenced by the location of fossil fuel reserves and the ability to harness renewable energy resources such as solar and wind. It is estimated that global energy consumption will increase mainly in Asia. The economic development of India and China will be the key factor. Since 2000, energy use in Asia has already doubled.

Global Food Consumption rich countries consume more calories than poor. In some of Africa, less than 2000 calories per day is leading to under nourishment. The world has the ability to feed all its inhabitants, but this does not happen because of greed, uneven distribution and poorer countries' inability to grow sufficient food.

Global Fresh Water consumption is based on the level of economic development. Water can be used domestically, for agriculture or industry. In MEDC, the amount used in houses can be high due to piped supplies and labour saving machines. In these countries, energy production and industrial processes need a lot of water and arable farming uses irrigation on a large scale.

To know how and why the supply and demand for water has changed in the past 50 years.

In developing countries the supply of piped drinking water has increased, giving 2.3 billion more people access to drinking water. In developed countries the supply has changed little. There has been an increase in the global demand for water due to

- An increase in manufacturing in developing countries
- An increase in electricity generation
- An increase in domestic use (piped supply and labour saving machines)
- An increase in meat production (Asia). Meat production uses ten times more water than cereals.
- An increase in irrigation
- An increase in leisure and importance of personal hygiene
- An increase in global population.

To know why there are differences between developed and developing countries.

In the UK people use about 1200m^3 of water per year each. This is about three times as much as people in LICs. There are also big differences in what the water is used for. LIC use most of their water in agriculture and relatively little in industry and domestic use. HICs use most water in industry and agriculture. Agricultural use in LICs is inefficient with a lot of water being added to fields by irrigation channels and the flooding of fields. A lot of this water runs off the surface, drains away or evaporates. In HICs, irrigation tends be better with less being wasted. Timed sprinklers and drip feeds are used to supply water to the right places at the right time. Industrial use is lower in LICs. Large factories in HICs have a high use of water, especially in cooling. Domestic HIC homes have a piped supply and have baths, showers and flushing toilets. Many have washing machines and dishwashers. In LIC, the water is often brought in buckets wells or communal taps. As it is in short supply it is used carefully to minimise waste. Washing of clothes and dishes is done by hand and bathing often takes place in rivers.

Geography - Year 11 Term 1 – Water Resources

To know the UK problems of regional and seasonal imbalances and an ageing infrastructure.
In the UK, most of the rainfall occurs in the upland areas of the north and west, but most of the people live in the south and east. Most of the rainfall falls in the winter but is needed domestically and by arable farmers in the summer. Infrastructure, reservoirs and pipes are needed to store the water and then to move it to where it is needed. Many pipes are over 100 years old and leak. In 2009, this was more than 1/3rd of the supply. Over 5 years, Thames Water spent £1 billion and reduced leaks by 27%. There will always be leaks due to changes in temperature and heavy lorries on roads but they need to be reduced to meet future water demand.

To know emerging countries water supply problems, untreated water, pollution and low rainfall.
Estimated that 10% of the global pop. do not have access to safe drinking water, most living in rural Africa. 900million a day suffer from diarrhoea and it can kill children and the elderly in Africa. If children are effected there education suffers, if it is adults, then they lose income.
Diarrhoea, cholera and typhoid are caused by water related diseases. Human faeces in water supply causes diarrhoea. This happens when water courses are used as toilets and water sources. 2.3 billion people have no effective sanitation system or ability to wash hands.
Poor farming practise leaves soil exposed allowing erosion and sediment pollution. High sediment in water can upset people's digestion and fertilisers, pesticides or metals washed from mines can add to health problems.
Areas such as the Sahel (Niger, Chad) have chronic water shortages due to drought. Rainfall has fallen by 30% over 50 years. The low rainfall that occurs is then lost through evaporation.

To know why water resources require sustainable management.
There is a finite amount of water in the world therefore we must use it wisely.
800 million people currently have no access to safe drinking water.
2 million tonnes of waste is put into water courses daily.
In developing countries 70% of industrial discharge goes straight into rivers.
The global population continues to grow and 80 million extra people each year need water.
By 2050 the demand for water will increase by 55%.
There is an increase in demand for meat which requires more water to produce.

To know how desalination can solve water shortages.
Desalinisation is where salt is removed from seawater to make it drinkable. There are currently 16,000 desalinisation plants producing drinking water. Saudi Arabia has the most desalinisation plants, with the USA in second place. The biggest problem with desalinisation is that it takes a lot of energy. However, the plants get around this by either using their own cheap oil and gas, cheap night-time electricity or solar power to operate the plants.
Other Problems with Desalinisation
In older plants, as little as 10% of water that enters the plant becomes drinkable.
The waste salty water that is then pumped back into the sea where it may have environmental impacts.
The high tech equipment needs to be cleaned as it gets clogged with bacteria.
Fish and other creatures are sucked into the plants and killed.
Desalinisation plants are far too expensive for poorer countries to afford.

To know how the UK and Kenya have managed their water resources in a sustainable way.
UK Problem - For many years the **UK** has transferred water from areas of high rainfall to areas of high population, but new schemes would be costly. The UK has also taken water from underground aquifers to satisfy demand but these are not recharging as quickly and is causing rivers to run dry. There is also uncertainty about changes in rainfall that could result from climate change.
UK Solution - To ensure there is no water shortage the government has a series of policies.

- Water companies have to produce 25 year plans which show their sustainable management of water sources.
- Water companies have efficiency targets to cut the amount of water leaking from pipes.
- Many websites tell people how to save water in their homes.
- Greywater reuse is promoted for industry.
- The number of groundwater abstraction licences has been reduced to allow aquifer recharge.
- Wildlife groups are now involved in river basin management as well as the water companies and Environment Agency.

Kenyan Scheme	Description
Tree Nurseries	Young trees are grown from seed. These are then planted to give shade reducing evaporation form the field surfaces.
Sand Dam	Dams are built by local communities using appropriate technology and materials free to obtain from the river. Evaporation does not occur from the reservoir which is within the sand. The reservoir naturally gets bigger each year.
Terracing	The sloping land is flattened to stop surface runoff and promote infiltration into the soil.
Rainwater Harvesting	Rainwater is captured on the roof of large buildings such as the village school. This water is then used to flush the toilets improving sanitation and waste disposal and reducing the need to use fresh water.
Rock Catchments	A small kerb like dam on a steep hill allows impermeable rock surfaces to collect rainwater. This is then directed into underground storage tanks to be used by the local community.

PSHE- Knowledge organiser- Y11- Term 1

Themes	Topics	Key learning points
Living in the wider world	Personal skills development 	• Resilience: the capacity to withstand or to recover quickly from difficulties. • In a growth mindset, people believe that their most basic abilities can be developed through dedication and hard work—brains and talent are just the starting point. This view creates a love of learning and a resilience that is essential for great accomplishment. • Someone with a growth mindset views intelligence, abilities, and talents as learnable and capable of improvement through effort. On the other hand, someone with a fixed mindset views those same traits as inherently stable and unchangeable over time. • GCSE Revision Methods That Work: 1. Work Through Past Exam Papers 2. Write Revision Notes On Flash Cards 3. Draw Spider Diagrams Using Pictures And Colour 4. Use Revision Guides, Apps, Websites And Videos 5. Read Aloud And Walk About! 6. Make Up Raps, Rhymes, Chants And Songs 7. Record Key Points On Your Phone 8. Stick Up Posters And Use Sticky Notes 9. Explain a Topic To A Parent Or Friend 10. Write Things Out Again And Again……

Health and well being	Staying healthy 	• Cancer: happens when cells divide and grow in an abnormal way. • Mutated BRCA gene; this is a mutation in your cells and means your risk of developing breast cancer is between 50-90% higher than someone that doesn't carry the gene. • Breast cancer: is the most common type of cancer in the UK. Most women diagnosed with breast cancer are over the age of 50, but younger women can also get breast cancer. About 1 in 7 women are diagnosed with breast cancer during their lifetime. There's a good chance of recovery if it's detected at an early stage. For this reason, it's vital that women check their breasts regularly for any changes and always have any changes examined by a GP. • Testicular cancer: 1 of the less common cancers, and tends to mostly affect men between 15 and 49 years of age. Typical symptoms are a painless swelling or lump in 1 of the testicles, or any change in shape or texture of the testicles. It's important to be aware of what feels normal for you and you need to check your testicles once a month. Get to know your body and see a GP if you notice any changes. • Drug: a medicine or other substance which has a physiological effect when ingested or otherwise introduced into the body. • Illegal drugs: Possessing, using and selling illegal drugs is a crime and may result in a custodial sentence. • Habit: a regular behaviour that is repeated sometimes without thought. • Addiction: unable to stop doing something as a habit, especially something harmful. • Alcohol: is a potent and potentially dangerous drug. It lowers inhibitions, increases the desire to take risks, slows reactions, impairs memory and makes us more impulsive. The effects of alcohol are stronger in young people not accustomed to drinking. The developing teenage brain is more susceptible to the effects of alcohol. • Drugs: are highly addictive and can have devastating effects including years of physical and mental illness and potentially an early death. • Nicotine: is highly addictive and the health problems and early death associated with cigarette use is still one of the highest costs to the NHS.

RSE	Life to the full 	• Beliefs: ideas you hold to be true. • Values : a set of principles which a person considers to be of great importance. • Attitudes: a way of thinking or feeling with regards to someone or something. • Self-respect: loving yourself and treating yourself with care. It's the result of staying true to your values and not being willing to compromise. The more you engage in behaviours consistent with your beliefs and values, the more you'll feel fulfilled and confident. • Dignity: the right of a person to be valued and respected for their own sake, and to be treated ethically. • Sex: bonds two people together and it can lead to pregnancy. • Contraception: Birth control, also known as contraception, anticonception, and fertility control, is the use of methods or devices to prevent unintended pregnancy. These methods are caps or diaphragms. combined pill. condoms. contraceptive implant. contraceptive injection. contraceptive patch. female condoms, IUD (intrauterine device or coil). • NFP: natural family planning is a method of working out when a woman is most fertile and then avoiding unprotected sex at that time to prevent pregnancy. This method is supported by The Catholic Church because it respect God's design for married love. • Pornography: Gives unrealistic expectations and unhealthy sex education. It can harm relationships by fostering selfishness and self-satisfaction; it is often linked to masturbation and can be highly addictive. • Sexual health: a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence. For sexual health to be attained and maintained, the sexual rights of all persons must be respected, protected and fulfilled. • STIs: sexually transmitted infection. in 2022 there were 392,453 diagnoses of new STIs among England residents, an increase of 23.8% compared to 2021 (317,022) both gonorrhoea and syphilis have returned to the high levels reported in 2019 (prior to the coronavirus (COVID-19) pandemic) • Red flags in relationships and signs of coercive control are: ◦ Isolating a person from their family and friends ◦ Controlling their finances ◦ Monitoring their activities and movements ◦ Repeatedly putting them down, calling them names or telling them they are worthless ◦ Threatening to harm them ◦ Threatening to publish information about them ◦ Damaging their property or household goods

PSHE- Knowledge organiser- Y11- Term 2

Living in the wider world	IAG	• A levels: subject-based qualifications that can lead to university, further study, training, or work. You can normally study three or more A levels over two years. They're usually assessed by a series of examinations. • College course: (e.g. BTEC, NVQ, SVQ) are more practical as it is to prepare you for a specific job. • Apprenticeship: you are based in a workplace but also doing some training at college. You need some qualifications and be successful in an interview. • T levels: They are equivalent to 3 A levels and can be studied in some schools and colleges. They combine academic study with on-the-job experience. • CV: Curriculum Vitae - a Latin term which means "the story of your life" It is a short list of facts about you, your skills, qualifications, experience and career history. • Personal profile: is the first item on your CV. It's a brief introduction to outline your attributes, qualities and work experience. • Reference: A personal reference is usually one that confirms your character and abilities. A professional reference is usually to check that you have worked where you said you did and you really are a good employee. • Tuition fee: charged by universities and colleges to cover key elements of your course and academic life, as well as core services related to students' wellbeing and experience on campus. • Loan: money that is borrowed and will be paid back. • Tuition Fee Loans: cover the full cost of your course, are paid directly to the course provider, and you won't have to pay it back until after your course, when you're earning above a certain level. They are not means tested (the amount you get does not depend on your household income) • Maintenance loan: Student Loan provided by the government, and it's intended to help towards your living costs while you're at university. Rent, bills, food, nights out – all of these things and more are what the Maintenance Loan is there to help you pay for. They are mean tested. • Household income: the total gross income received by all members of a household within a 12-month period. This figure comprises the earnings of everyone under the same roof who is age 15 or older, whether they're related or not.

Living in the wider world	Finance	• Budgeting: The process of calculating how much money you must earn or save during a particular period of time, and planning how you will spend it. • Money mule: a person who transfers stolen money, usually through their own back accounts, on behalf of others. The process of transferring money to hide its criminal sources is traditionally referred as money laundering. It is a criminal act. If caught moving stolen funds, money mules will be left with no bank account, a damaged credit score and the inability to apply for a loan or even a phone contract in the future. They could also end up with a 14 year prison sentence for the crime. • Social engineering: all techniques aimed at talking a target into revealing specific information or performing a specific action for illegitimate reasons. • Smishing: social engineering attack that uses fake mobile text messages to trick people into downloading malware, sharing sensitive information, or sending money to cybercriminals. • Vishing: a type of cyber attack that uses voice and telephony technologies to trick targeted individuals into revealing sensitive data to unauthorized entities. • Phishing: when attackers attempt to trick users into doing 'the wrong thing', such as clicking a bad link that will download malware, or direct them to a dodgy website. • Malware: a file or code, typically delivered over a network, that infects, explores, steals or conducts virtually any behaviour an attacker wants. • Gambling: playing a game of chance for a prize, where a prize is defined as money or 'money's worth'. • Impulsivity: acting without thinking about the consequences. • Delayed gratification: favouring long term rewards over short terms rewards.

Remember!

- We will be open and honest, but not discuss directly our own and others personal/ private life.
- Your teacher will not repeat what is said in the room except if she/he is concerned we are at risk.
- It is ok to disagree but we will not judge.
- Taking part is important but we have the right to pass.
- We will not make assumptions and we will listen to others' point of view.
- We know that there are no stupid questions but we will use appropriate language.
- If we need further help or advice, you know you can talk to your teachers, form tutor and SSOs.

Week	Topic	Aiming for a grade 4	Aiming for a grade 5/6	Aiming for a grade 7/8/9	Foundation Tests	Higher Tests
1 2	Topic 1: Algebra 1	• Simplifying expressions • Substitution • Solving linear equations	• Linear Inequalities and number lines	• Inequality regions • Proof functions	1. Functions - F 2. Equations and inequalities - F	1. Functions - H 2. Equations and inequalities-H
3	Topic 2: Fractions, decimals and percentages	• FDP equivalence • Calculating percentages • Fractions of amounts	• Reverse Percentages		3. FDP 4. Fractions and percentages	3. FDP 4. Fractions and percentages
4 5	Topic 3: Shape 1	• Basic angle facts • Properties of shapes • Interior and exterior angles	• Bearings	• Circle theorems	5. Geometrical reasoning – F 6. Bearings - F	5. Geometrical reasoning – H 6. Bearings - H
6 7	Topic 4: Number 1	• Four rules with integers and fractions • Rounding and Estimation • Directed number arithmetic	• Limits of accuracy	• Surds • Recurring decimals	7. Non – calculator method - F	7. Non – calculator method - H
Half term						
8	PPE					
9 10	Topic 5: Graphs	• Plot y=mx+c • Interpret real-life graphs • Plot quadratics	• Parallel lines • Find the equation of the line	• Perpendicular lines • Equation of a circle	8. Gradient and lines - F 9. Non-linear graphs - F 10. Using graphs - F	8. Gradient and lines - H 9. Non-linear graphs - H 10. Using graphs - H

			• Cubic and reciprocal graphs			
11 12	Topic 6: Ratio and Proportion	• Simplify ratios • Share in a ratio • Direct proportion	• Use fractions in ratios • Density and pressure • Inverse proportion	• Equations with proportion • Gradients of curves	11. Ratio and Fractions - F	11. Ratio and Fractions - H
13 14	Topic 7: Shape 2	• Perimeter and Area 2-D shapes • Volume and Surface Area of prisms	• Arc length and the area of a sector • Volume of cones etc. • Plans and elevations	• Circle theorem recap	12. Area of Trapezia and circles 13. Working with circles - F 14. Three dimensions	12. Area of Trapezia and circles 13. Working with circles - H 14. Three dimensions
End of Term 1						

OCR GCSE DRAMA - DEVISING DRAMA PORTFOLIO
SECTION 2 CREATING & DEVELOPING DRAMA - KNOWLEDGE ORGANISER

1 HOW DID YOU BEGIN THE DEVISING PROCESS?

CONSIDER THE FOLLOWING:

- ❑ HOW DID YOU BEGIN TO GENERATE PERFORMANCE WORK?
- ❑ **HOW DID YOU USE THE STIMULUS TO GENERATE PERFORMANCE WORK?**
- ❑ HOW DID YOU BEGIN TO GENERATE TEXT?
- ❑ WHAT WERE THE BENEFITS/CHALLENGES OF YOUR INITIAL PROCESS?

2 WHAT HAS INFLUENCED YOUR DEVISING?

CONSIDER THE FOLLOWING:

- ❑ WHAT PERFORMANCE WORK INFLUENCED YOUR DEVISING? HOW AND WHY?
- ❑ WHAT PRACTITIONERS HAVE INFLUENCED YOUR DEVISING? HOW AND WHY?
- ❑ WHAT THEATRE COMPANIES HAVE INFLUENCED YOUR DEVISING? HOW AND WHY?
- ❑ **HOW DID THE STIMULUS MATERIAL INFLUENCE YOUR DEVISING?**

3 WHAT DECISIONS WERE MADE?

CONSIDER THE FOLLOWING:

- ❑ WHAT STAGING TYPE DID YOU CHOOSE AND WHY?
- ❑ WHICH REHEARSAL TECHNIQUES DID YOU USE AND WHY?
- ❑ WHICH THEATRICAL CONVENTIONS ARE USED IN YOUR PIECE AND WHY?
- ❑ HOW ARE YOU USING DESIGN ELEMENTS TO COMMUNICATE MEANING?
- ❑ HOW DID YOU DEVELOP YOUR CHARACTER/PLOT/SCENES?
- ❑ WHAT KEY IDEAS/CHOICES WERE SUGGESTED/MADE BY **YOUR GROUP**?
- ❑ WHAT KEY IDEAS/CHOICES WERE SUGGESTED/MADE BY **YOU**?

4 WHAT CHANGES WERE MADE?

CONSIDER THE FOLLOWING:

- ❑ HOW AND WHY DID YOUR PERFORMANCE CHANGE DURING THE CREATING AND DEVELOPING PROCESS?
- ❑ HOW DID YOUR GROUP SELECT AND REJECT DEVISING MATERIAL?
- ❑ WHAT CHANGES WERE MADE BASED ON FEEDBACK RECEIVED DURING THE PROCESS?
- ❑ WERE ANY CHANGES MADE DURING FINAL/DRESS/TECHNICAL REHEARSALS? IF SO WHY?

5 HOW DID YOU STRUCTURE YOUR CREATING AND DEVELOPING PROCESS?

CONSIDER THE FOLLOWING:

- ❑ WHAT WAS YOUR REHEARSAL SCHEDULE?
- ❑ HOW WERE YOUR REHEARSALS CONDUCTED?
- ❑ WHAT DID YOU ACHIEVE IN YOUR REHEARSALS?
- ❑ HOW DID YOUR REHEARSAL SCHEDULE IMPACT THE DEVISING PROCESS AND PERFORMANCE?
- ❑ WHICH OF YOUR REHEARSALS WERE 'KEY REHEARSALS' AND WHY?

AO1- *Create and develop ideas to communicate meaning for theatrical performance.*

- Narrative of the learners' *journey* through the development process is *highly developed*.
- Learner has been *accomplished* in their devised performance throughout the creating and developing process.

AO4- *Analyse and evaluate their own work and the work of others*

- *Highly developed* justifications of the changes made during development of the devised performance.
- Highly developed analysis of how their own work will create meaning and communicate to the audience

KS4 Knowledge organiser
Sonic Features of music

- **Instrumentation** - instrumental techniques, type of ensemble, alternative instrumentation, sonic features, electronic sound.
- **Texture** - solo, duet, homophonic, polyphonic, unison.
- **Timbre** - sonic features, electronic sound, FX
- **Tonality** - Scales and modes, major scale, minor scale, blues scale, modes, ragas, exotic scales
- **Harmony** - major and minor triads, power chords, 7th chords, sus chords, extended chords, suspension, inversions, chord sequences, arpeggios, broken chords.
- **Rhythmic** techniques - meter, tempo/bpm, syncopation, swing, drop sanking, polyrhythms, hemiola, phasing.
- **Structure/Form** - verse/chorus, 12-bar blues, through-composed, bridge, intro, outro, ABACAD
- **Melodic techniques** - conjunct, disjunct, chromatic, diatonic, phrasing, repetition, sequence, ornamentation, motifs, round/canin, riffs, hooks, head, improvisation
- **Production** - microphone use, recording style, sampling, FX, Looping, controllerism, turntablism, quantisation, sequencing, automation.

'Macbeth' – Knowledge Organiser

Context

- **King James I –** Macbeth was written in 1606, early in the reign of James I, who succeeded to the English throne in 1603 after being King of Scotland. The play pays homage to the king's Scottish lineage and hatred of witches. Additionally, the witches' prophecy that Banquo will found a line of kings is a nod to James' family's claim to have descended from the historical Banquo.
- **The Divine Right of Kings** – the idea that kings got their power from God and not from their subject. James I was a believer in this, and the idea meant that any treasonous activity was a crime against God. Only a century earlier, England had suffered under the massive disorder of the Wars of the Roses, so many supported the idea to avoid civil unrest.
- **Patriarchy** – patriarchal societies are those in which men dominate, and inheritance passes through male heirs.
- **Gender** – Macbeth and Lady Macbeth switch between having masculine and feminine characteristics. In the play, gender is often linked to ambition and a willingness to do anything to achieve power.
- **Women** – Women were expected to follow social expectations with their behaviour towards men. They were meant to obey all men, be faithful and respectful, not be violent and be religious. They would have been regarded as a possession, first owned by the father, then given to and owned by the husband. Women were considered the delicate, 'fairer' sex and they should be quiet and reserved, always respecting the wishes and opinions of the males in their lives. Lady Macbeth subverts these expectations in the play to manipulate Macbeth in getting what she wants.
- **Adam, Eve and the serpent** – in the bible, Adam and Eve live peacefully in the Garden of Eden until Eve is tempted by the serpent and eats the forbidden fruit from the tree of knowledge. She convinces Adam to eat as well, and God curses them and banishes them to Earth. The serpent is frequently alluded to in Macbeth.
- **Witchcraft** – in Shakespeare's time there was no scientific knowledge to explain natural disasters such as earthquakes, floods and droughts. One of the ways they accounted for the unexplained was the idea of witches. In Elizabethan England, hundreds of thousands of women were tortured and executed in Europe because they were accused of witchcraft. The King wrote a book on the subject entitled 'Daemonologie' and appealed to parliament to pass the following act in 1563 which was still a part of English law until 1951. At the time Shakespeare was writing, many people thought that witches were real, so the weird sisters would have seemed believable and frightening to an audience in the 1600s.
- **The 5 Acts:** Macbeth is a typical tragedy. The first part builds up the turning point (Duncan's murder), and the second part deal with the consequences of this, which leads to the main character's downfall.
- **Tragic Conventions:** Macbeth is one of Shakespeare's Tragedies and follows specific conventions. The climax must end in a tremendous catastrophe involving the death of the main character; the character's death is caused by their own flaw(s) (hamartia); the character has something the audience can identify with which outweighs their flaws so we care about them.
- **The Real Macbeth:** Macbeth is loosely based on true events in feudal Scotland in the 11th Century and would have been known to King James. King James inherited the throne through his ancestors Banquo and Fleance who appear in the play.

Key Things to Remember

- The play was written in 1606 but was set in the 11th century (Medieval period).
- In the play, King Duncan was a benevolent king and loved by all. In real life he was a weak king.
- Banquo is intrigued by the prophecies and does have ambitious thoughts, but he does not choose to act on these thoughts.
- There are many similarities between Banquo and Macbeth. They are both soldiers, they are both very patriotic at the start of the play and they are both considered to be brave and noble.
- Shakespeare believed the human nature is prone to evil and that people are greedy. He illustrates this in the Macbeths' desire to become King and Queen. This greed led them to resort to extreme measures such as regicide. In Macbeth's case, his greed led him to kill others, too.
- Macbeth kills Macdonald, Duncan, Duncan's guards and Young Siward himself.
- Macbeth orders the deaths of Lady Macduff, her family and household and Banquo.
- Macbeth is the only Shakespearean play set in Scotland.
- Macbeth's castle is in Inverness. The Royal Palace is in Dunsinane.
- The Gunpowder Plot occurred in 1605, one year before the play was written.

Characters	
Macbeth	A loyal warrior who becomes duplicitous as he becomes obsessed with the witches' prophecies of power.
Lady Macbeth	Macbeth's wife who drives his ambition in the beginning but loses her control by the end.
Banquo	Macbeth's close friend and ally who also receives prophecies.
Fleance	Banquo's son who represents innocence and justice.
Duncan	King of Scotland at the beginning of the play - a strong, respected leader.
Malcolm	Duncan's oldest son and next in line to the throne. Joins the English army to defeat Macbeth at the end of the play.
Donalbain	Duncan's youngest son disappears (to Ireland) after Duncan's murder.
Macduff	Macbeth's antagonist: A brave warrior who is loyal to Duncan and is consistently suspicious of Macbeth.

Themes	
Ambition	The witches' prophecies spur Macbeth and Lady Macbeth to fulfil their ambitions, but they never *make* them do anything.
Fate and Free Will	What made it all happen? Fate? The witches? Macbeth's free will?
Good and Evil	Good and evil are hown through contrasts in the play. Evil is illustrated by the witches, Macbeth, Lady Macbeth, the assassins & traitors. Good is shown by Duncan, Malcolm, Banquo, Macduff, Lady Macduff.
The Supernatural	This is shown through the witches & LM calling upon the spirits.
Appearance and Reality	M and LM look innocent but are plotting behind people's backs.
Light and Darkness	Light links to good, life and God. Darkness links to evil and foreboding.
Guilt	Guilt is shown through M (internal conflict) and LM's blood imagery.
Gender	LM challenges and controls M. She subverts the gender stereotypes of the time.

Plot

Act 1

- The 3 witches gather to meet Macbeth and Banquo.
- Duncan hears the Thane of Cawdor has betrayed him.
- Macbeth is seen as a hero.
- Macbeth and Banquo hear the predictions.
- Duncan decides that Malcolm will be heir to the throne.
- Duncan plans to visit Macbeth.
- Lady Macbeth reads Macbeth's letter.

Act 2

- Macbeth has doubts and sees a vision of a floating dagger.
- He follows through with Duncan's murder.
- LM has to finish the job by wiping blood on the drunk guards.
- Macduff discovers Duncan's body.
- The guards are the likely suspects.
- Macbeth kills the guards.
- Malcolm and Donalbain flee the castle because they are afraid.

Act 3

- Banquo suspects Macbeth for the murder of King Duncan.
- Macbeth sends murderers to kill Banquo. Banquo is murdered but Fleance escapes.
- The ghost of Banquo is at the banquet. Macbeth rants and raves. LM tries to cover up the situation.
- Macduff didn't attend the banquet as he is suspicious of Macbeth.

Act 4

- Macbeth visits the 3 witches and they show him more visions. He believes he can't be killed by any man.
- Macbeth sends murderers to Macduff's castle to kill his family.
- In England, Macduff begs Malcolm to return to the throne.
- Malcolm tests Macduff's loyalty then agrees to the war against Macbeth.

Act 5

- LM has gone mad with guilt. She sleepwalks and tries to clean blood from her hands. She commits suicide.
- Many of Macbeth's supporters decide to help Malcolm. Macbeth isn't worried as he believes the prophecies.
- Macbeth confronts Macduff and learns that he was not born naturally but by caesarean section.
- Macbeth and Macduff fight and natural order is restored when Macbeth is killed and Malcolm is crowned king.

Key Quotations

Act 1

- "Fair is foul, and foul is fair" (1.1) Witches
- "For brave Macbeth – well he deserves that name" (1.2) The Captain
- "So foul and fair a day I have not seen" (1.3) Macbeth
- "Stars hide your fires, let not light see my black and deep desires" (1.4) Macbeth
- "Come you spirts…unsex me here and fill me from the crown to the toe top full of direst cruelty." (1.5) Lady Macbeth
- "Look like the innocent flower but be the serpent under'it" (1.6) Lady Macbeth
- "When you durst do it, then you were a man" (1.7) Lady Macbeth
- "But screw your courage to the sticking place and we'll not fail." (1.7) Lady Macbeth

Act 2

- "Is this a dagger I see before me, the handle towards my hand?"(2.1) Macbeth
- "Give me the daggers. The sleeping and the dead are but as pictures" (2.2) Lady Macbeth
- "Will all great Neptune's ocean wash this blood clean from my hand?" (2.2) Macbeth
- "A little water clears us of this deed" (2.2) Lady Macbeth
- "Wake Duncan with thy knocking, I would thou couldst." (2.2) Macbeth
- "Oh horror! Horror! Horror! Tongue nor heart cannot conceive, nor name thee" (2.3) Macduff
- "There's daggers in men's smiles" (2.3) Donaldbain

Act 3

- "Thou has it all now, King, Cawdor, Glamis, all, as the weird sisters promised, and I fear though play'st most foully for't." (3.1) Banquo"To be thus is nothing, but to be safely thus. Our fears in Banquo stick deep" (3.1) Macbeth
- "Of full of scorpions is my mind, dear wife" (3.2) Macbeth
- "Be innocent of the knowledge, dearest chuck, till thou applaud the deed" (3.2) Macbeth
- "Thou canst not say I did it; never shake they gory locks at me" (3.4) Macbeth
- " My lord is often thus, and hath been from his youth" (3.4) Lady Macbeth
- "I am in blood stepp'd so far, that, should I wade no more, returning were as tedious as go o'ver" (3.4) Macbeth

Act 4

- "Something wicked this way comes" (4.1) Witches
- "Speak, I charge you" (4.1) Macbeth
- "From this moment, the very firstlings of my heart shall be the firstling of my hand" (4.1) Macbeth
- "The castle of Macduff I will surprise; seize upon Fife." (4.1) Macbeth
- "Let grieve convert to anger. Blunt not the heart, enrage it" (4.3) Malcolm
- "Macbeth is ripe for shaking, and the powers above put on their instrument" (4.3) Malcolm

Act 5

- "Out, damned spot! Out, I say!... Will these hand ne'er be clean?" (5.1) Lady Macbeth
- "All the perfumes of Arabia will not sweeten this little hand" (5.1) Lady Macbeth
- "My name's Macbeth" (5.7) Macbeth
- "Turn, hell-hound, turn…I have no words; my sword is my voice" (5.8) Macduff
- "I bear a charmed life which must not yield to one of woman born" (5.8) Macbeth
- "Macduff was from his mother's womb untimely ripp'd" (5.8) Macduff
- "I will to yield to kiss the ground before young Malcolm's feet" (5.8) Macbeth
- "Behold where stands the usurper's head" (5.9) Macduff
- "His fiend-like queen who, as 'tis thought, by self and violent hands took off her life" (5.9) Malcolm.

Key Terminology

Antithesis	Opposite / Contrast
Aside	A remark heard only by the audience.
Dramatic Irony	When the audience knows things that the characters don't.
Iambic Pentameter	A line of verse, with 5 metrical feet, each with one unstressed syllable followed by one stressed syllable.
Juxtaposition	Two things closely placed with contrasting effect.
Monologue	A long speech by one actor.
Motifs	A dominant / recurring idea.
Paradox	A person/thing with contradictory features or qualities.
Semantic field	A group of words, which relate to a common theme or motif.
Soliloquy	Speaking one's thoughts aloud.

Key Vocabulary

Ambition	Strong desire to achieve something.
Apparitions	A ghost/ghost-like image of a person.
Betrayal	Being disloyal.
Catholics	A person belonging to the Christian church.
Fatal Flaw	A defect / weakness in character.
Hallucination	Apparent vision of something not present.
Invincible	Feeling too powerful to be defeated.
Jacobean	Relating to the reign of King James I.
Kinsman	A relative / blood relation.
Masculinity	Qualities considered to be of a man.
Noble	Belonging to aristocracy.
Protestant	A member of the Western Christian church.
Regicide	The action of killing a king.
Remorseless	Without guilt or regret.
Scepticism	Doubts the truth of things.
Thane	A man with land granted by the king.
Tragedy	A play with tragic events.
Traitor	A person who betrays someone.
Treason	Betraying one's country.
Virtuous	Having high moral standards.

SPORT STUDIES R184

TOPIC AREA 1

Barriers to Participation in Sport

- Limited time available to participate
- Cost of participation
- Lack of provision or accessibility
- Discrimination





Groups who Experience Barriers to Participation

- Carers
- People with Family Commitments
- Gender
- Retired People/Over 60s
- Teenagers
- Parents (Singles or Couples)
- Ethnic Groups
- People Who Work
- People with Disabilities
- Families with Children
- Young Children
- Unemployed/Economically Disadvantaged

Popularity of Sports in the UK depends upon....

Environment
The lack of optimal conditions can reduce participation

Provision of Facilities
In towns and cities there are more facilties available than in small villages

Spectatorship
A sport will become more popular if there are opportunities to spectate live or on TV.

Success
If an individual or team are successful at an event such as the Olympics, the sport will grow in popularity

Media Coverage
Some sports get more medica coverage than others

Social Acceptability
Not all sports are seen as ethically acceptable

The Number of People Participating
Sports with high numbers of participants will get lots of media coverage and grow even further

Role Models
Role models, who are highlighted in the media, can increase the number of people wanting to participate in a certain sport


Emerging Sports in the UK


Women's Football


Ultimate Frisbee


Women's Cricket

Improving Participation in Sportt

- Provision → The availability of sport
- Promotion → The advertising and marketing of sports
- Access → The accessibility of sport to all people in society



Values Promoted Through Sport

- Team Spirit
- Fair Play
- Inclusion
- Citizenship
- Tolerance & Respect
- National Pride
- Excellence

The Olympic Values

Respect – Excellence – Friendship

The Paralympic Values:

Courage – Determination – Inspiration – Equality

TOPIC AREA 2

Etiquette: 'The customary code of polite behaviour in society or within sport'

Sportsmanship refers to fair and generous behaviour, particularly in a sporting context.

Clapping an opponent when they reach 50 runs in cricket

Shaking hands at the end of a match in football

Disdvantages of taking PEDs

- Cheating /Immoral
- Illegal
- Health Risks
- Fines/Bans
- Reputational Damage

Gamesmanship is the use of dubious methods to win or gain an advantage within a sport.

Deliberately grunting loudly in tennis

Reasons for taking PEDs

- Wealth/financial reward
- Pressure to succeed
- Need to win at any cost

- Increased chance of gaining sponsorship
- Level the playing field
- Boost confidence

General Media Conventions

Codes and Conventions
System of signs to help create meaning.
Symbolic Codes
Setting, mise-en-scene, acting, colour
Technical Codes
Camerawork, editing, audio, lighting,
Written Codes
Print language, spoken language.
Conventions
Form conventions, story conventions, genre conventions.
Genre
The TV or Film type
Hybridity
Combination of three genres
Intertextuality
The process by which meanings from one text becomes part of, or refer to another.
Character types
Propps, protagonist, binary oppositions within the TV show.

Knowledge Organiser: CSP Television & Film

Media Audiences

Mode of address
The way a media product 'speaks' to its audience.
Demographics
The characteristics and make-up of a sample of the population, eg age, gender, nationality.
Active audience
Audiences that, rather than sitting passively in front of a media product, positively interact with what they are seeing and hearing
Passive audience
An audience that just observe events rather than actively respond to it.
NRS: Social Demographic Scale
A system of demographic classification used in the UK.
Psychographic Demographic
Information based on audiences habits, hobbies and values.
Uses & Gratification Theory
An approach to understanding why and how people actively seek out specific media to satisfy specific needs.

Media Representation

Femininity
A set of attributes, behaviours, and roles associated with girls and women.
Masculinity
Possession of qualities traditionally associated with men; handsome, muscled, driven
Social groups
Upper, Middle, Lower class social groups represented within the TV show.
Fantasy Genre
How is this represented within Class & Dr Who?
Stereotypes
A widely held but fixed and oversimplified image of idea of a particular type of person.
Teenagers
How are teenagers represented in Dr Who and Class?

Media Industries

Production Company
A company that produces films and television shows.
Production Budget
Production budget calculates the number of units the production company create the Film or TV show.
BBC
British Broadcasting Company
BBFC
British Board of Film Classification

Historical, Social and Cultural Contexts

Dr Who v's Class
How do both the shows reflect society and culture at the time of production? Similarities and differences between these shows in terms of when they were produced?
BBC3
Online viewing platform only
BBC
First channel on British Television

How Sport is Covered Across the Media

OCR Sport Studies

Television

Terrestrial

Terrestrial TV is free to watch as long as you have a TV License. You can watch channels such as BBC, ITV and Channel 4. Some international matches are shown on these channels, along with the FA Cup Final.

Satellite

Satellite TV is usually paid for through a monthly subscription. It includes channels such as Sky Sports and BT Sport. This allows you to watch Premier League games for both football and rugby.

Pay Per View

Pay Per View involves paying a one off fee to watch a match or event. They are usually boxing matches and can be bought from Sky Sports Box Office or BT Sport Box Office.

Written Press

Newspapers

Newspapers cover sport in the back section. They mainly focus on football, rugby and cricket, but do give some coverage to other sports.

Magazines

Sports magazines usually offer coaching tips, information on the latest equipment and interviews with professionals.

Fanzines

Fanzines are magazines written by fans for fans. They usually include interviews, match reviews and information on the team.

Books

Sports books can be in the form of autobiographies, books on the history of the game or a certain team and books on tactics.

Internet

Social Media

Players and teams often use social media to engage with fans and keep them up to date.

Podcasts

Podcasts can be listened to online and discuss various topics in sport.

Blogs

A blog discusses different topics in sport, they usually focus on one sport.

Live Streams

Live streams allow people to watch a match live online.

P2P Sharing

Peer to Peer file sharing is a way to watch videos online.

Fan Sites

Fan websites are created by fans for fans.

Video-sharing Sites

A video sharing website allows people to access sport videos.

Radio

Internet Radio Stations

Most radio stations can also be listened to online.

National Radio Coverage

National radio coverage covers the whole country. They will usually cover some sport in their news section, but this will focus on the top teams.

Local Radio Coverage

Local radio stations cover a smaller area and will give more coverage to local teams.

Dedicated Sport Radio Stations

Sports radio stations give live commentary, interviews and often have opportunities to phone in.

Positive and Negative Effects that the Media can have on Sport

OCR Sport Studies

Positives

- Increased exposure of minority sports. For example, darts became more popular after Sky coverage. 

- Increased promotional opportunities. Clubs can have their own TV channels and websites. 

- Education. Media coverage can help educate people on rules and techniques. 

- Increased income which benefits sport. Income generated by the media can be invested in to facilities and youth programmes. 

- Inspiring people to participate. Coverage of events such as The Olympics can encourage people to get involved in sport. Media coverage also gives us a lot of positive role models. 

- Competition between sports and clubs. Competition for viewers means that clubs need to think more about the need customers and how they can attract more viewers. 

Negatives

- Decline in live spectatorship. Sport is so easily accessible from home and online that this can lead to less people going to watch the game live. 

- Loss of traditional sporting values. The media can put more pressure on athletes and teams to win which can work against sportsmanship.

- Media coverage of inappropriate behaviour of athletes. Inappropriate behaviour both on and off the pitch is often documented by the media. For example swearing and violent conduct on the pitch or behaving badly off the pitch.

- Increased pressure on officials. Decisions can often be scrutinised and hype around certain events can often make their job harder.

- Newspapers are dominated by a few sports. Male dominated sports are often featured more in newspapers. 

- Saturation. There is so much sport coverage that some people may get fed up with it.

The Relationship Between Sport and the Media

Sport uses the media to promote itself. For example some high profile clubs have their own TV channel.

The media uses sport to promote itself. For example more people will buy Sky because they want access to the sport it offers.

Sport as a commodity. Many sports rely on the media as a source of revenue and it can also help attract wealthy owners.

Sponsorship and advertising. The amount of media coverage given to sport can help bring in more sponsors for clubs and athletes.

The adoption and rejection of sporting heroes can be influenced by the media. For example David Beckham is seen as a sporting hero.

Criticism through the media has increased. Sports performers and management are now much more exposed to the media.

Evaluating the Media Coverage of Sport

OCR Sport Studies

Aspects which may influence the coverage of a story

Tabloid ← Type/brand of media outlet. → Broadsheet

Competition with other media outlets.

For example newspapers might try to write a different spin on a story.

Target audience.

A newspaper will try to report in a way that is relatable to its target audience.

Timing of the event/story.

If the issue or person is already in the news then each new revelation can be magnified.

Popularity or size of the individual or club being covered.

Some clubs or players may have a reputation and may be seen as an easy target and some powerful clubs or individuals may not be targeted.

Features of the coverage which may vary from one media outley to another

Representation of the issue, organisation or individual involved.

e.g what is the focus of the story

Method of reporting.

e.g language/tone

Format/presentation.

e.g use of images, balance between text/images, headlines and captions

Potential bias.

e.g does the media outlet have something to gain by taking a certain stance

Extent of the coverage.

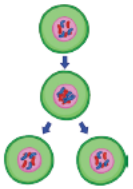
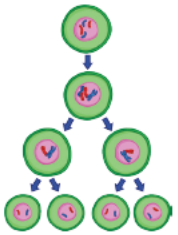
e.g how many pages are devoted to the story

Duration of the coverage.

e.g is the story revisited day after day

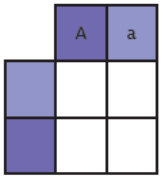
Year 11 Science – Term 1

Biology B6 – Inheritance, variation and evolution

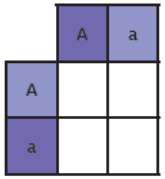
Mitosis	Meiosis
Produces two daughter cells.	Produces four daughter cells.
Daughter cells are genetically identical.	Daughter cells are not genetically identical.
The cell divides once.	The cell divides twice.
The chromosome number of the daughter cells is the same as the parent cells. In humans, this is 46 chromosomes.	The chromosome number is reduced by half. In humans, this is 23 chromosomes.
Used for growth and repair, and asexual reproduction.	Produces gametes for sexual reproduction.
	

How to Complete a Punnet Square

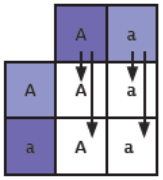
Step 1: Put the two alleles from one parent into the boxes at the top. This parent is a heterozygote. This means they have one dominant and one recessive allele.



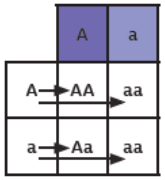
Step 2: Put the two alleles from the second parent into the boxes on the left. This parent is also a heterozygote.

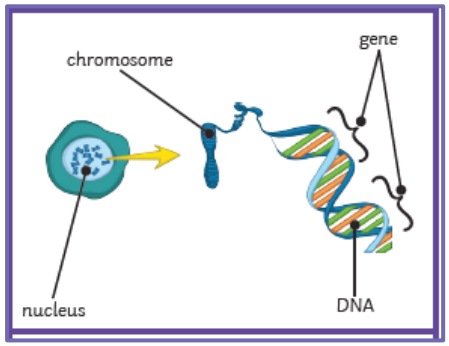


Step 3: Put the alleles from the first parent into the two boxes beneath them.



Step 4: Put the alleles from the second parent into the two boxes to the right of them.





Evolution

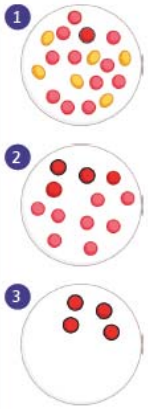
All species of living things have evolved from simple life forms by natural selection.

- If a variant/characteristic is advantageous in an environment then the individual will be better able to compete.
- This means they are more likely to survive and reproduce.
- Their offspring will inherit the advantageous allele.

Resistant Bacteria

To reduce the rate at which antibiotic resistant strains appear:

- Antibiotics should only be used when they are really needed, not for treating non-serious or viral infections.
- Patients should complete their courses of antibiotics, even if they start to feel better.
- The agricultural use of antibiotics should be restricted.



1. There is variation in the bacterial population. One bacterium develops a mutation by chance that means it is resistant to an antibiotic.
2. The antibiotic kills some of the bacteria, the resistant bacterium survives and reproduces.
3. The antibiotic kills the rest of the non-resistant bacteria so the person may start to feel a little better. The resistant bacterium has survived the antibiotic and continues to multiply.

Fossils

Fossils could be:

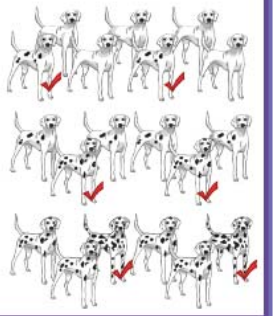
- the actual remains of an organism that has not decayed;
- mineralised forms of the harder parts of an organism, such as bones;
- traces of organisms such as footprints or burrows.

Many early life forms were soft-bodied so have left few traces behind.

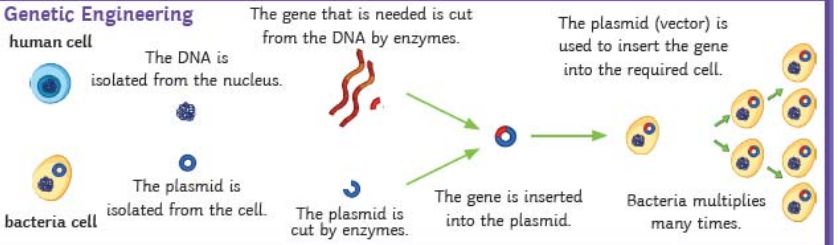
Fossils help us understand how much or how little organisms have changed as life developed on earth.

Selective Breeding

- Choose parents who have the desired characteristic.
- Select the best offspring and breed these to make the next generation.
- These offspring are then bred again and again, over many generations, until a desired result is achieved.



Genetic Engineering



Classification

Linnaeus classified living things into kingdom, phylum, class, order, family, genus and species.

Organisms are named by the binomial system of genus and species.

Due to evidence from chemical analysis, there is now a 'three-domain system' developed by Carl Woese.

Domain	bacteria	archaea	eukaryota			
Kingdom	eubacteria	archaebacteria	protista	fungi	plantae	animilia

Variation

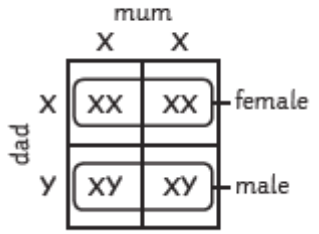
Variation maybe be due to differences in:

- the genes that have been inherited (genetic causes);
- the conditions in which they have developed (environmental causes);
- a combination of genes and the environment.

Sex Determination

Females carry two X chromosomes.

Males carry one X and one Y chromosome.



Year 11 Science – Term 1

Biology B7 - Ecology

Abiotic and Biotic Factors

Abiotic factors are the non-living factors of an environment. E.g. moisture, light, temperature, CO_2, wind, O_2 or pH.

Biotic factors are the living factors of an environment. E.g. predators, competition, pathogens, availability of food.

Adaptations

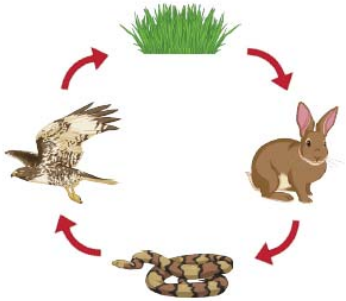
Adaptations are specific features of an organism which enable them to survive in the conditions of their habitat.
Adaptations can be structural, behavioural or functional:

- **Structural adaptations** are features of the organism's body e.g. colour for camouflage.
- **Behavioural adaptations** are how the organism behaves e.g. migration to a warmer climate during colder seasons.
- **Functional adaptations** are the ways the physiological processes work in the organism e.g. lower metabolism during hibernation to preserve energy.

A plant or animal will not physically change to adapt to its environment in its lifetime. Instead, there is natural variation within the species and only organisms whose features are more advantageous in the environment survive. The survivors then go on to reproduce and pass on their features to some of their offspring. The offspring who inherit these advantageous features are better equipped to survive.
Charles Darwin described this process as 'survival of the fittest'.

Food Chains

The source of all energy in a food chain is the sun's radiation. It is made useful by plants and algae which produce organic compounds through photosynthesis.

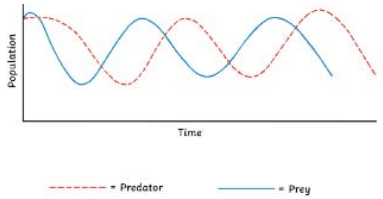


The living organisms use the energy to produce biomass and grow.

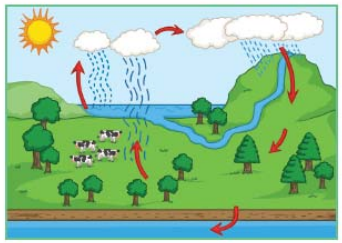
When a living organism is consumed, some of the biomass and energy is transferred. Some of the energy is lost.

Remember: the arrow in a food chain indicates the direction of the flow of energy.

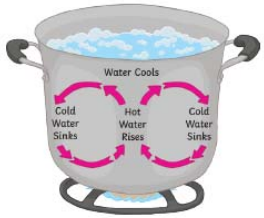
Populations of predators and prey increase and decrease in cycles. The size of the predator population depends on the size of the prey population and vice versa. Overall, there is a stable community.



Water Cycle



Convection is the movement caused within a fluid as the hotter, less dense material rises and colder, denser material sinks under the influence of gravity. This results in the transfer of heat.



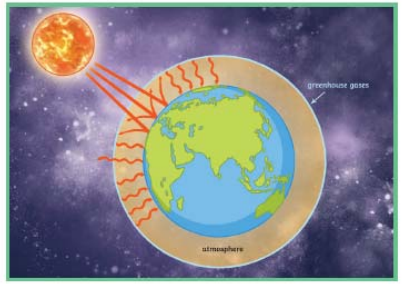
Evaporation occurs when heat energy from the surroundings (or a heat source) is transferred to water particles as kinetic energy. The particles begin to move more rapidly and can turn from a liquid into a gas.

When moving particles transfer kinetic energy to the surroundings, the particles begin to move more slowly and can turn from a gas into a liquid. This is **condensation**.

Precipitation occurs when rain, snow, sleet, or hail falls to (or **condenses** on) the ground.

Transpiration is the process by which water is carried through plants from roots to the stomata on the underside of leaves and it evaporates into the surroundings.

Global Warming



The greenhouse effect is the natural process where some of the Sun's radiation is trapped within the insulating layer of the atmosphere. This maintains a temperature suitable to support life on Earth.

Most of the radiation from the Sun is absorbed by the Earth when it reaches the surface. The rest of the infrared radiation is reflected from the surface and absorbed by the greenhouse gases and clouds in the atmosphere. This is then re-emitted in all directions.

However, due to many contributing factors, the global temperature is gradually increasing. Several gases, called greenhouse gases, trap the heat around the Earth; the most concerning is carbon dioxide. Human activities contribute to the excess amount of carbon dioxide in the atmosphere and so are a cause of global warming.

Global warming leads to the melting of ice caps, rising sea levels, flooding, changes to climate, changes in migration patterns, changes in species distribution and reduction in biodiversity.

Competition

Species will compete with one another and also within their own species to survive and to reproduce.

Mutualism occurs when both species benefit from a relationship.
Parasitism occurs when a parasite only benefits from living on the host.

Animals compete for resources such as food, water and space/ shelter. They may also compete within their own species for mates.
Plants compete for resources including light, water, space and minerals. All these resources are needed for photosynthesis so the plant can make its own food. Plants do not need to compete for food.

Deforestation and Land Use

Humans use land for buildings, quarrying, mining, agriculture and landfill. As the human population increases and we take more land, there is less space for other organisms to live.
Deforestation (to use wood as a fuel/material or to clear space for other uses) destroys habitats where other organisms live.

Peat bogs are produced when decomposition occurs over a very long time. Peat stores a lot of carbon and can be extracted for use by gardeners or as an energy source. Burning peat releases a lot of carbon dioxide into the atmosphere which contributes to the greenhouse effect.

Trees absorb carbon dioxide for photosynthesis, so as they are cut down and removed, less carbon dioxide is taken from the atmosphere. Furthermore, when the trees are burned, they release carbon dioxide back into the atmosphere. The excess carbon dioxide can lead to global warming and the changes to the ecosystem cause reduced biodiversity.

Biodiversity and Waste Management

Biodiversity is the variety of living organisms on the earth or in an ecosystem. It is important in helping to maintain stable ecosystems. Organisms are often interdependent, relying on others as food sources, or to create suitable environmental conditions to survive. Human survival is also dependent on this biodiversity.

The global human population has exceeded 7 billion.
Human population has increased due to modern medicine and farming methods, reducing famine and death from disease.
This means a greater demand for food, resources and water.
It also means more waste and emissions are created.

Sewage, toxic chemicals, household waste and gas emissions pollute the water, land and air, killing plants and animals and reducing biodiversity.

RPI: Field Techniques Quadrats and Transects

The distribution of an organism is affected by the environment and abiotic factors.
Quadrats can be used to measure the frequency of an organism in a given area e.g. the school field. You could count the individual organism or estimate the percentage cover. You must collect data from at least two areas to make a comparison. Quadrats should always be placed randomly.

Transects are used to measure the change of distribution across an area e.g. from the edge of a river and moving further from the water's edge. You could either count the number of organisms touching the transect at regular intervals or use a quadrat placed at regular intervals along the transect.

$$\text{mean} = \frac{\text{total number of organisms}}{\text{number of quadrats}}$$

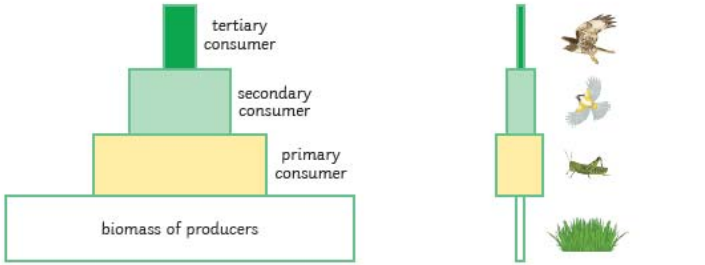
Year 11 Science – Term 1

Biology B7 - Ecology

Pyramids of Biomass and Biomass Transfer

Biomass is the amount of living matter in a given area.

To find the biomass, we simply multiply the mass of an individual organism by the number of organisms.



A **pyramid of biomass** shows you how much biomass there is in each trophic level. They should be drawn to scale so each bar accurately represents the amount of biomass in that trophic level.	A **pyramid of number** shows you how many of each organism there is in each trophic level.

On average, only 10% of the biomass is transferred to the next trophic level each time.

Energy is lost from trophic levels as heat energy when the organism respires or moves.

Energy is used by the organism for life processes such as homeostasis and growth.

Some of the biomass cannot be eaten e.g. snail shell.

Not all of the organism is eaten by a consumer e.g. stalks and roots.

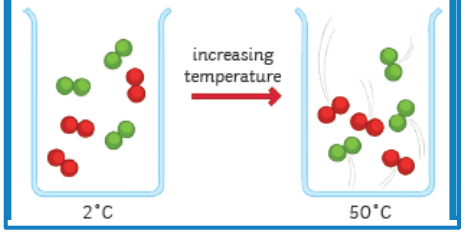
Biomass and energy are lost in excretions (like poo).

$$\text{Efficiency} = \frac{\text{energy available to the next trophic level}}{\text{energy that was available to the previous trophic level}} \times 100$$

Chemistry C6 – Rate of reactions

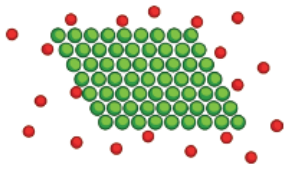
Temperature

When the temperature of the reaction mixture is increased, the reactant particles **gain kinetic energy** and move much more quickly. This results in **more frequent successful collisions** between the reactant particles, therefore, **increasing the rate of the reaction**.



Surface area

Large lumps of a solid have a **small surface area to volume ratio**. If the solid is broken up into smaller lumps or crushed into a powder, this will increase the surface area to volume ratio.



A larger area of the solid is now exposed to other reactant particles. This increases the frequency of successful collisions thus increasing the rate of reaction.

Reversible Reactions

A reversible reaction is one in which the **reactants form products**. The products are then able to react together to **reform the reactants**.

For example:
A reacts with B to form C and D.
C and D are able to react to form A and B.

The equation would be as follows (where the **double arrow symbol** represents a **reversible reaction** is taking place):

$A + B \rightleftharpoons C + D$

The **forward reaction** goes to the **left** and the **backwards reaction** goes to the **right**. For example, if the forward reaction is exothermic then the backward reaction will be endothermic. The amount of energy that is transferred is the same for both the forward and reverse reaction.

Hydrated copper sulfate is a blue substance. We say that the copper sulfate is hydrated as it **contains water**. The copper sulfate is heated and the water evaporates leaving a white substance known as **anhydrous** copper sulfate. Anhydrous meaning **no water**.

The word equation for the reaction is as follows:

hydrated copper sulfate $\rightleftharpoons$ anhydrous copper sulfate + water

$CuSO_4.5H_2O(s) \rightleftharpoons CuSO_4(s) + H_2O(l)$

The reaction can be reversed when water is added to the anhydrous copper sulfate.

Year 11 Science – Term 1

Chemistry C6 – Rate of reactions

Required practical 5: measuring production of a gas

This method outlines one way to carry out an investigation to collect a gas from a chemical reaction.

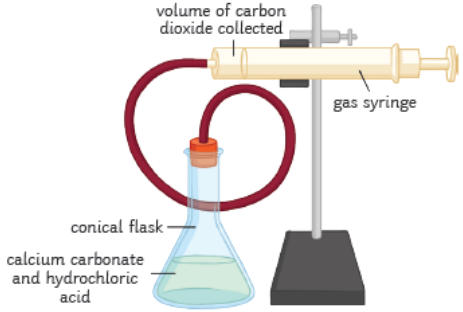
The practical involves changing the concentration of hydrochloric acid and measuring the volume of carbon dioxide gas produced when the acid reacts with calcium carbonate.

The word equation for the reaction is as follows:

calcium carbonate + hydrochloric acid → calcium chloride + water + carbon dioxide

The symbol equation for the reaction is:

$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$



Method

Step 1 – Clamp a gas syringe to a retort stand using a boss and clamp. Ensure the syringe is a quarter of the way from the top of the stand. Place the delivery tube to the end of the gas syringe.

Step 2 – Measure out 50ml of hydrochloric acid using a measuring cylinder and pour into a conical flask.

Step 3 – Using a top pan balance, measure out 0.5g of powdered calcium carbonate and place in the conical flask.

Step 4 – Immediately connect the bung and delivery tube to the conical flask. Start the stopwatch.

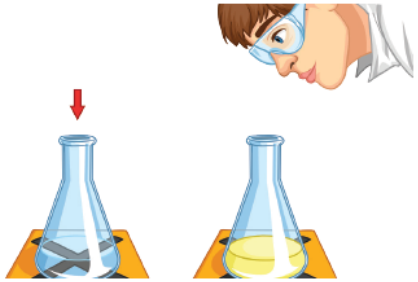
Step 5 – Record the volume of carbon dioxide gas produced every 10 seconds.

Step 6 – When the reaction has finished and there are no more bubbles of gas being produced, clean the equipment and repeat using four other different concentrations of hydrochloric acid.

When analysing the results from the practical investigation, plot a graph of Time (s) against Volume of Gas Produced (cm^3). Draw a curve of best fit through the points. A graph should be plotted for each concentration of acid.

Calculate the mean rate of reaction (cm^3/s) for each concentration of acid used. This can be calculated by dividing the total mass of gas produced (cm^3) by the reaction time (s).

Required Practical 5: Investigating a Change in Colour



This method outlines one way to carry out an investigation into the effect of increased temperature on the rate of a reaction.

The word equation for this reaction is as follows:

sodium thiosulfate + hydrochloric acid → sodium chloride + water + sulfur dioxide + sulfur

The symbol equation for this reaction is:

$Na_2S_2O_3 + 2HCl \rightarrow 2NaCl + H_2O + SO_2 + S$

The reaction between sodium thiosulfate and hydrochloric acid produces a **precipitate**. **Sulfur** is responsible for the formation of the precipitate. A precipitate is a **solid** that is formed in a solution. It is the formation of this precipitate that causes the reaction mixture to become **cloudy**; the cloudiness is a way to measure the **reaction time**.

Method

Sodium thiosulfate from three different temperatures may be used, for example, ice cold, room temperature and hot.

Step 1 – Place a black cross on a white tile.

Step 2 – Using the first temperature, measure out 35cm^3 of sodium thiosulfate using a measuring cylinder. Place the liquid in a conical flask and position over the black cross on the white tile.

Step 3 – Measure out 5cm^3 of water and 10cm^3 of hydrochloric acid in separate measuring cylinders.

Step 4 – Pour the water and acid into the conical flask.

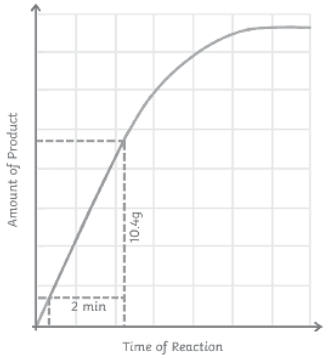
Step 5 – Pour the measured amount of sodium thiosulfate into the conical flask and immediately start the stopwatch.

Step 6 – Look down through the conical flask to the black cross below. When the black cross is no longer visible, stop the stopwatch and record the results in a table.

Step 7 – Repeat the steps with the remaining temperatures of sodium thiosulfate.

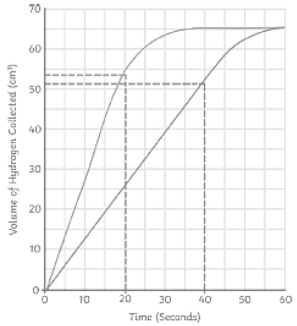
Calculating Gradient (Higher Tier Only) gradient = $\frac{y}{x}$

On the graph, draw construction lines on the part of the graph that has a straight line. Measure the values of x and y.



In the graph below, the gradient of the first line is much steeper than the second line. This indicates that a faster reaction is taking place. Remember, the steeper the line, the faster the reaction.

To calculate the reaction rate at a specific time period, construction lines must first be drawn on the straightest part of the graph.



For the first line, what is the rate of reaction at 20 seconds?

54 ÷ 20 = 2.7cm^3/s

For the second line, what is the rate of reaction at 40 seconds?

52 ÷ 40 = 1.3cm^3/s

Dynamic Equilibrium

In a **closed system** (this means nothing can get in or out), a reversible reaction can reach **dynamic equilibrium**. This is where the **forward** and **reverse reactions** are occurring at the **same rate** and the **concentrations** of all the substances that are reacting remain constant.

Chemistry C6 – Rates of reactions Higher Tier Only

Changing Conditions and the Effect on the Position of Equilibrium (Higher Tier Only)

The reaction between nitrogen and hydrogen to make ammonia is an industrial process called the Haber process. It requires a high temperature, high pressure and an iron catalyst.

The symbol equation for the reaction is as follows:

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

According to **Le Chatelier's Principle**, the position of equilibrium can be altered by changing the conditions of the reaction i.e. the pressure, concentration and/or the temperature. The **position** of the **equilibrium** will shift to **counteract** any changes made.

Increasing the **temperature** of the reaction in the forward direction (exothermic) will result in the equilibrium shifting in favour of the reverse direction (endothermic) to reduce the temperature.

From the equation, it is clear that on the **left-hand side**, there are **four molecules** and on the **right-hand side**, there are **two molecules**. If the **pressure** in the system were **increased**, the equilibrium **position would shift to the right** as there are fewer molecules. If the pressure in the system were **decreased**, the equilibrium **position would shift to the left** as there are a larger number of molecules.

If the **concentration** of one of the **reactants were increased**, then the equilibrium position would move in **favour of the products**. This would result in more product being produced. If the concentration of the **products were decreased**, equilibrium would shift to **favour the products**. More reactants would react until equilibrium is reached.

Year 11 Science – Term 1

Chemistry C10 – Using resources

Sustaining Human Life on Earth

The human **population** is **increasing** rapidly and our use of earth's finite resources has increased. If humans continue to use these resources at the rate at which we are, then we will reach a point where the human population cannot be sustained on earth.

Humans use the **earth's natural resources** for warmth, shelter, food, clothing and transport. Scientists are making **technological advances** in **agricultural** and **industrial processes** to provide food and other products that meet the growing needs of the human population but it is of major importance that this is done in a sustainable way so that our finite resources are not used up.

Earth's Resources

Finite resources are those of which there is a **limited supply**, for example coal, oil and gas. These resources can be used to provide energy but, one day, their supply will run out.

Crude oil is processed through **fractional distillation** and **cracking** to produce many useful materials such as petrol, diesel and kerosene.

Renewable resources will not run out in the near future because the reserves of these resources are high. Examples of renewable resources include solar energy, wind power, hydropower and geothermal energy.

Water Treatment

Before the **wastewater** from industry, agriculture and peoples' homes can be released back into the environment, it must be **treated**.

Pollutants such as human waste contain **high levels of harmful bacteria** and **nitrogen compounds** which can be a **danger to aquatic organisms**.

Industrial and agricultural waste may contain **high levels** of **toxic metal compounds** and **fertilisers and pesticides** which may also damage the ecosystem.

Cleaning sewage requires several steps:

Step 1 – The water must be **screened**. This is where material such as branches, twigs and grit is removed.

Step 2 – The water undergoes **sedimentation**; wastewater is placed in a settlement tank. The heavier solids sink to the bottom and form a sludge whilst the lighter effluent floats on the surface above the sludge.

Step 3 - The effluent is then transferred to another tank where the organic matter undergoes **aerobic digestion**. Although not pure, this water can be safely released back into the environment. The sludge is placed in another tank where the organic matter undergoes **anaerobic digestion**. It is broken down to produce fertiliser and methane gas which can be used as an energy resource (fuel).

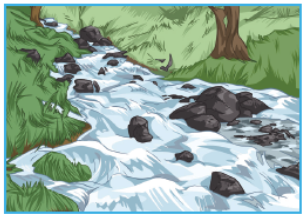
Water

Potable water is water that is **safe to drink**. Potable water is **not pure; dissolved impurities** still **remain** in the water. Pure water is odourless, tasteless and colourless compared to rainfall or water from streams and wells as these **harbour chemicals** such as acid.

Pure – the **definition** of a pure substance is one that contains only a single type of material that has not been contaminated by another substance.

Potable water must contain **low levels** of microbes and salts for it to be deemed safe to consume. This is because **high levels** of microbes and salts can be harmful to human health.

The methods of making water safe vary depending on where you live. Starting with sea water is harder than starting with fresh water. This is because the **energy cost** of removing large amounts of sodium chloride from seawater is greater.



In the UK, our populations' water needs are met through **rainfall**. During the **summer, water levels** in reservoirs **decrease** and local areas are encouraged to reduce their water usage by swapping baths for showers and they are asked to avoid using hosepipes.

In the UK, **insoluble particles** are **removed** from naturally occurring fresh water by passing it through **filter beds**. **Microbes** are **killed** by **sterilising the water**. Several different sterilising agents are used for potable water. These are chlorine, ozone or ultraviolet light. The right amount of chlorine and ozone gas (O_3) must be used as both are harmful to human health.

Desalination of Sea Water

If fresh water supplies are limited, sea water can undergo a process called **desalination**. This process requires **large amounts of energy**, but can be done by distillation or the use of membranes such as **reverse osmosis**.

Distillation involves **heating** the sea water until it reaches **boiling point**. Once the water is boiling, it will begin to **evaporate**. The steam then rises up where it cools and condenses in a condensing tube. The salt is left behind. The **downside** to this process is the **energy cost** of boiling the water and cooling down the steam sufficiently in the condensing tube. Not all of the water evaporates which leaves behind a **salty wastewater** that can be **difficult to sustainably dispose of** without harming aquatic organisms.

Reverse Osmosis of Salt Water

Osmosis, as you will have learnt in biology, is the **movement of particles** from an area of **high** concentration **to** an area of **low** concentration through a **semi-permeable membrane**.

Reverse osmosis involves **forcing water** through a **membrane** at **high pressure**. Each membrane has tiny holes within it that only allow water molecules to pass through. Ions and other molecules are prevented from passing through the membrane as they are too large to fit through the holes.

The **disadvantage** of this method is that it produces **large amounts of wastewater** and requires the use of **expensive membranes**. Due to a large amount of wastewater produced, the efficiency of this method is very small.

Required Practical 8 – Analysis and Purification of Water Samples from Different Sources

Analysing the pH of Water Samples

Test the pH of each water sample using a pH meter or universal indicator. If using universal indicator, use a pH colour chart so that you are able to identify the pH of the sample against the colour produced by the indicator.

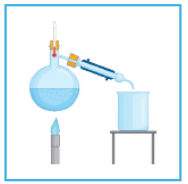
Analysing the Mass of Dissolved Solids

To measure the mass of dissolved solids in a water sample, measure out 50cm^3 of the sample using a measuring cylinder. Take the mass of an evaporating basin before heating and record the mass in a table. Place the measured amount of water into an evaporating basin and gently heat over a Bunsen burner until all the liquid has evaporated. Once the evaporating basin has cooled, place it on a top pan balance and record its mass. Calculate the mass of the solid left behind.

Distillation of the Water Sample

To distil a water sample, set up your equipment as per the diagram.

Heat the water sample gently using a Bunsen burner. After a short period of time, distilled water should be produced.



Life-Cycle Assessment (LCA)

Life-Cycle Assessments follow the four main stages of the life cycle of a product.

Stage 1 – Extracting the raw materials needed to make the products and then processing them.

At this stage, the energy and environmental costs need to be considered. For example, if the raw material being used is a finite or renewable resource, the energy to extract and transport the raw material should be considered. Environmental factors also play a large part in stage 1 as the extraction of the raw material can leave scars on the landscape and waste products may be produced that could damage local ecosystems.

Life-Cycle Assessment (LCA) (continued)

Stage 2 – Manufacturing and packaging of the product.

The main consideration is how much energy and resources are needed to manufacture the product. Energy may be used in the form of fuel, electricity or chemicals used in the production of the product. In the manufacturing process, there may be pollution and waste products that need to be considered. Transportation of the goods from the factory to the user will have an environmental impact.

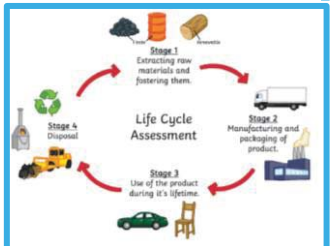
Stage 3 – Use of the product during its lifetime.

The environmental impact of a product during its life depends on the type of product. For example, a car will have a significant impact i.e. it needs to be filled with petrol or diesel, a finite resource, to get to where you are going. A car's engine releases harmful emissions into the atmosphere. On the other hand, a wooden chair may only need minor repairs and is made from a renewable resource.

Stage 4 – Disposal at the end of a product's life.

There are different methods of disposal:

1. Landfill – the product is put in a hole in the ground – high environmental impact.
2. Incineration (organic matter) – burning of the product – low environmental impact.
3. Recycling – for example, batteries contain metal compounds that are not good for the environment. By recycling, it means that no new compounds have to be taken out of the ground.



Year 11 Science – Term 1

Chemistry C10 – Using resources

Comparative LCAs

Comparative LCAs are used to evaluate products and to find which one will have a lower environmental impact.

Stage of Life Cycle	Plastic Bag	Paper Bag
Stage 1 – raw material	Uses a finite resource (crude oil). The processes of fractional distillation, cracking and polymerisation all require energy to make crude oil useful.	Made from trees/recycled paper. Making paper from trees requires more energy than recycled paper because trees have to be chopped down. Still uses less energy than making plastics from crude oil.
Stage 2 – manufacture	Cheap to make.	More expensive to make.
Stage 3 – use	Plastic bags have a low environmental impact as they can be used a number of times. In comparison to paper bags, they are much stronger.	Paper bags can only be reused a limited number of times and so have a short lifetime.
Stage 4 – disposal	The downside to plastic bags is that they do not biodegrade easily in landfill. Recycling options are available. If they are not disposed of correctly, plastic bags can have a detrimental impact on the environment and animal habitats.	Paper bags biodegrade easily in landfill sites.

Disadvantages of Comparative LCAs

The disadvantage of **comparative LCAs** is that some parts of it require certain judgements to be made.

Different people have different opinions and this is dependent on who completes the LCA and whether a certain level of bias is added. For example, if the LCA is completed by a company that is manufacturing a specific product, they may only discuss **some** of the environmental impact of their product in the LCA. Accurate numerical values, for example, show a company how much energy has been used in the **manufacturing process** or how much **carbon dioxide** was produced when the goods were transported.

Recycling

Many materials are made from **natural resources** that have **limited supplies**. Reusing items such as glass bottles that only need washing and sterilising saves energy and reduces the environmental impact. Not all products can be reused, some need to be recycled before reuse.

There are both advantages and disadvantages to recycling materials.

Advantages

- Fewer resources such as **mines** and **quarries** are needed to remove raw, finite materials from the ground. For example, copper.
- Crude oil, the raw material used in the production of plastics, does not need to be extracted. This, in turn, **avoids** high energy cost processes such as fractional distillation and cracking. If more items are recycled, less would end up in landfill sites.
- The amount of greenhouse gases would reduce as the energy cost of recycling is a lot **less** than making a new product.

Disadvantages

- Recycling items require collection and transport of the goods to the organisation. This involves using staff, vehicles and the use of fuel.
- Some materials, such as **metals**, can be **difficult to sort**; the amount of sorting is dependent on the purity of the materials or metals and the level of purity required for the final product. For example, copper used in electrical appliances must have a high purity. To achieve this, the copper needs to be processed and then melted down again to make copper wiring.
- Steel that is used in the construction industry does not require such high purity. Often scrap iron is added to the furnace when steel is made. This reduces the need for as much iron ore and reduces the cost of making steel.

Chemistry C10 – Using resources
Higher tier only

Biological Extraction Methods (Higher Tier Only)

Biological methods of extraction are needed as the resources of **metal ores** on earth are in **short supply**. Large scale **copper mining** leaves **scars on the landscape** and produces significant amounts of waste rock that must be disposed of. Biological methods have a lower impact on the environment and make use of waste containing small amounts of copper. The disadvantages of **biological extraction methods** are that they are **slow**, but they do reduce the need to obtain new ore through mining and conserve limited supplies of high-grade ore.

Phytomining

Phytomining involves the use of **plants**. Plants absorb the metal compounds found in the soil. The plants cannot get rid of the copper ions and it builds up in the leaves. The plants are then **harvested, dried** and then placed in a furnace. The ash that is produced from the burning process contains soluble metal compounds that can be extracted. The ash is dissolved in an acid such as hydrochloric or sulfuric and the copper is then extracted by electrolysis or through a **displacement reaction** with iron.

Bioleaching

Bioleaching uses **bacteria** to produce an acidic solution called **leachate** which contains **copper ions**. The disadvantage of bioleaching is that it produces **toxic substances** that are **harmful to the environment**. To process the copper, the copper undergoes a displacement reaction with iron. Iron is cheaper and a **more cost-effective** way of producing copper from the leachate.

Year 11 TRIPLE SCIENCE ONLY – Term 1

Biology B6 – Inheritance, variation and evolution

Advantages of sexual reproduction:

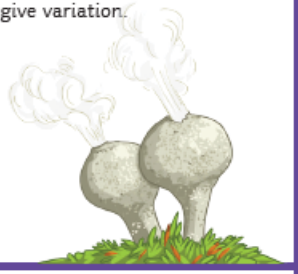
- Produces variation in the offspring;
- If the environment changes, variation gives a survival advantage via natural selection;
- Natural selection can be increased by humans in selective breeding to increase food production.

Advantages of asexual reproduction:

- Only one parent needed;
- More time and energy efficient as they do not need to find a mate;
- Faster than sexual reproduction;
- Many identical offspring can be produced when conditions are favourable.

Malarial parasites reproduce asexually in the human host but sexually in the mosquito.

Many fungi reproduce asexually by spores, but also reproduce sexually to give variation.

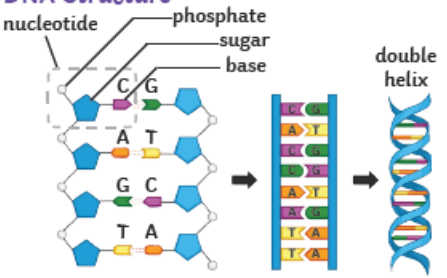


Evolution by Natural Selection

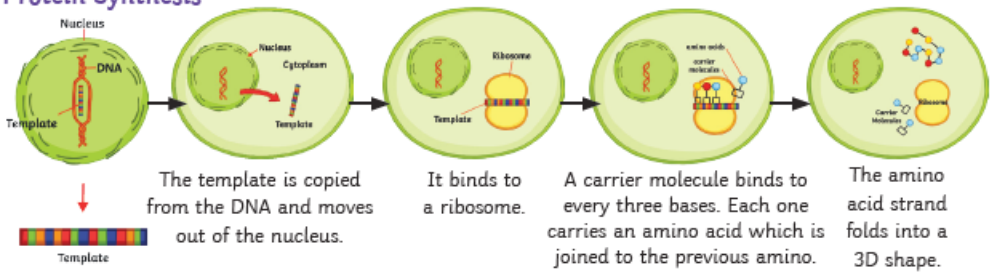
Darwin's theory was only gradually accepted because...

- the theory challenged the idea that God made all the animals and plants that live on earth.
- there was insufficient evidence at the time the theory was published to convince many scientists.
- the mechanism of inheritance and variation was not known until 50 years after the theory was published.

DNA Structure



Protein Synthesis



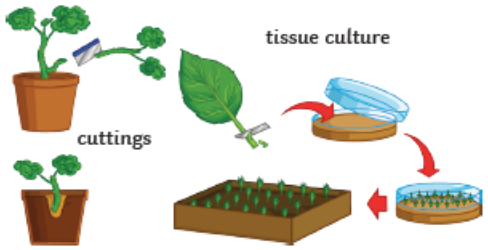
The template is copied from the DNA and moves out of the nucleus.

It binds to a ribosome.

A carrier molecule binds to every three bases. Each one carries an amino acid which is joined to the previous amino.

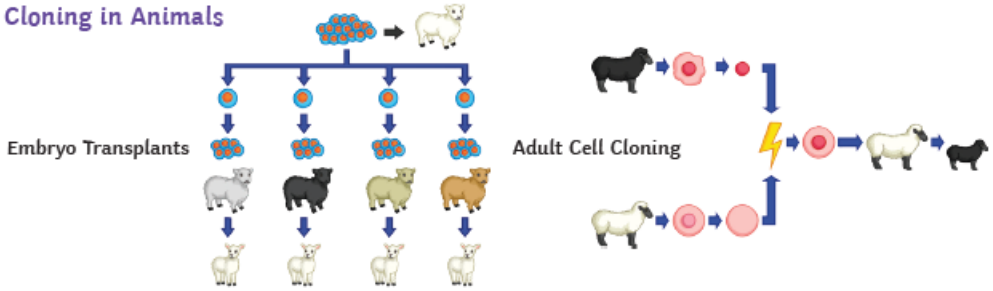
The amino acid strand folds into a 3D shape.

Cloning in Plants



Many plants produce seeds sexually, but also reproduce asexually by runners such as strawberry plants, or bulb division such as daffodils.

Cloning in Animals



The Understanding of Genetics

1866
Mendel published his results, identifying units of inheritance. His work goes largely unnoticed by other scientists.

1884
Mendel dies.

1900
Boveri provides the first evidence that chromosomes are passed on between generations.

1953
The structure of the double helix is discovered by James Watson and Francis Crick, using data from Rosalind Franklin.

1856
Mendel begins his research.

1882
The 'chromosome dance' of mitosis was observed by Walther Flemming.

1902
Chromosomes are observed separating into gametes in meiosis by Walter Sutton. The connection between chromosomes and Mendel's units is made.

Speciation

isolation – Parts of a population become geographically or environmentally isolated from each other.

conditions – If the conditions in each environment are different, then different characteristics will be advantageous.

natural selection – Organisms with this characteristic are more likely to survive and pass on the allele for it to their offspring.

speciation – Eventually, the two populations are so different they can no longer interbreed to produce fertile offspring.

Year 11 TRIPLE SCIENCE ONLY – Term 1

Biology B7 - Ecology

Impact of Environmental Change (HT only)

Changes in the environment can affect the abundance and distribution of the organisms living there.

Abundance means a very large number of organisms.

Distribution means the way in which the organisms are spread over an area.

The changes can be **seasonal**, **geographical** or caused by **human interaction** with the environment. The changing seasons mean that factors including temperature and availability of water can change. These factors impact the organisms living in the ecosystem.

- Birds such as geese migrate south from Europe during the winter months when the temperatures are colder.
- Whales migrate south through the oceans to breed in warmer waters near the equator.
- Worms bury themselves deeper into the earth during the winter to avoid the effects of frost and cold temperatures.
- Land animals such as caribou migrate to find warmer temperatures and food during the colder months.

Some species depend on certain conditions to thrive and give us an indication of factors, such as oxygen availability or pollution. For example, lichens: there are three types of lichens. A lichen is a plant species which grows in exposed areas such as rock surfaces or tree bark. They are adapted to absorbed nutrients from sparse sources, such as rain water. Depending on the level of pollution, different types of lichen are more abundant. We call these types of organisms **bioindicators** and they can help us to monitor the level of pollution or the different factors affecting an ecosystem.

Intensive Farming and Sustainable Fishing

To increase the efficiency of the energy transfer, farmers employ techniques to reduce the amount of energy lost between the trophic levels. These techniques are collectively known as **intensive farming**.

- Animal enclosures are covered and heated to regulate the temperature of the surroundings. This reduces heat loss and energy use for homeostasis and growth.
- Plant-growing spaces are covered and heated to regulate the temperature. This improves the growth and enables the environmental conditions to be controlled more closely.
- Some animals are fed high-protein foods and supplements to their usual diet to increase their growth and produce higher yields of meat, milk or eggs.

Although these methods increase the output, many people believe it is unnecessarily cruel to the animals. Due to the crowded nature of the enclosures, animals are given antibiotics to prevent disease. These antibiotics can be transferred to humans through our food, and scientists claim this is a possible cause of increasing bacterial resistance to antibiotics.

RPI: Decay - Investigating the Effect of Temperature on the Rate of Decay of Milk by Measuring pH Change

Milk is an alkaline solution.

- Phenolphthalein (an indicator) is pink in solutions with a pH of 10 or above.
- If the pH drops to about 8, the solution will become colourless.
- Lipase is an enzyme that will break down the fat in milk.
- As lipase breaks down fat to fatty acids, the pH of the solution lowers.

Independent variable – temperature (controlled by water baths and measured using a thermometer).
Dependent variable – time taken for indicator to change colour (measured using a timer).

To calculate the mean:

$$\frac{\text{total time taken for pink colour to disappear (s)}}{\text{number of trials}}$$

Remember to check for any anomalies. If there is an anomaly, discard it and do not add it to your total. Collecting repeated results and calculating an average allows you to identify any anomalous results and improves the reliability of your data.

Biotechnology

Biotechnology and agriculture can be combined to provide some possible solutions. These include the following:

- Mass production of mycoprotein which is a protein-rich food suitable for vegetarians.
- Genetically modified bacterium which produce human insulin which is a chemical used in the treatment of diabetes.
- Genetically modified crops, such as golden rice, which provide higher yields or greater nutritional values per unit.

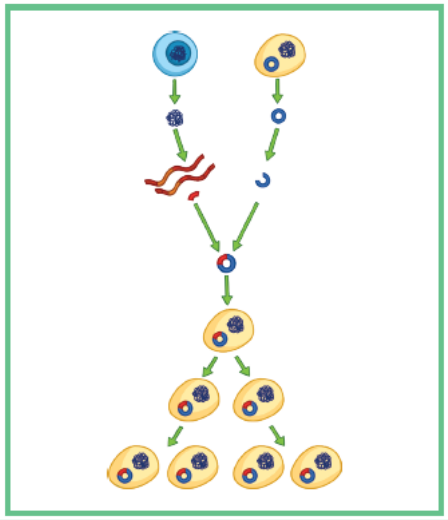
Mycoprotein Fermenters

- Mycoprotein is a protein product.
- It is made by the fungus *Fusarium*.
- The fungus is grown in 40m-high fermenters which run continuously in 5-week cycles.
- After the growth cycle, the fungus is harvested, purified, dried and prepared for food products.
- The fermenter is sterilised and ready to repeat the process with a new batch of fungi.

- Genetic modification uses technology to transfer genes from one species to another.
- It can be used to improve food production.
- Genes can be transferred to give plants increased resistance to herbicides, for example.

Genetically modified organisms may present a hazard to human health. They could lead to allergic reactions or have higher than natural levels of toxins.

Recombinant DNA technology involves the transfer of genes from one species to another. It can be used to make another organism, usually bacteria, produce a protein. The bacteria are grown in fermenters and can produce huge amounts of the protein. Human insulin is now produced using recombinant DNA technology, as described below.



Food Security

Food security means a whole population have access to enough nutritious food to sustain a healthy lifestyle. This is achieved using methods which the planet can continue to sustain for further generations of the population.
However, there are several biological factors which can threaten food security.

These factors include:

- increasing birth rate
- changing diets
- new pests and pathogens
- widespread famine
- drought
- increasing costs
- war and conflicts

Trophic Levels

Trophic levels describe the position of an organism within the food chain.

They can be represented by numbers.

The higher the number, the further along the food chain.

Trophic levels only represent the living organisms (so the sun isn't included).

Scavengers and decomposers are not represented in the trophic levels either.

Level 1: Producers

Level 2: Primary Consumers

Level 3: Secondary Consumers

Level 4: Tertiary Consumers

Year 11 TRIPLE SCIENCE ONLY – Term 1

Chemistry C10 – Using resources

Corrosion

Metals can corrode when **exposed** to **oxygen**; they oxidise and can form metal oxides. Some metals oxidise more quickly than others, like sodium, and some such as gold are very unreactive and do not oxidise at all.

Corrosion occurs when a metal continues to oxidise and the metal becomes weaker over time until it eventually becomes a metal oxide.

Rusting occurs when **iron or steel** reacts with **oxygen** in the **air or water**. Rusting is an example of corrosion.

iron + oxygen + water ⟶ hydrated iron(III) oxide

$4Fe + 3O_2 + 6H_2O \longrightarrow 4Fe(OH)_3$

How Can Rusting Be Prevented?

To prevent rusting, oxygen and water must be kept away from the iron or steel.

Storing the metal in an atmosphere containing unreactive argon prevents it from reacting with oxygen.

A substance such as calcium chloride can be used to absorb water vapour and keep the metal dry.

Composite Materials

Composites are made up of two materials: a **reinforcement** and a **matrix** which binds the reinforcement together.

Wood is a natural composite. The matrix is **lignin** which is a material that can be found lining the xylem vessels of plants. Wood is reinforced with **cellulose**; in wood, the cellulose fibres are lined up next to each other and this makes the wood stronger in one direction than another. **Chipboard** is a material that can be used for kitchen worktops and doors. Chipboard is made up of **wood chips** (reinforcement) that is randomly arranged and held together by **resin glue** (matrix). This makes it **strong in all directions**.

Fibreglass and carbon fibre reinforced polymer (CFRP) contain fibres that are strong under tension. Fibreglass contains glass fibres and CRFP contains **carbon fibres**, both of the fibre types are used as **reinforcement**. The fibres themselves are flexible but do not easily stretch. The fibres in each of these composite materials are held together by **polymer resin** (matrix) which helps to bind the fibres together making them stiff.

Concrete is such a versatile material and is often used in the construction industry. The strength of concrete can be increased by **reinforcing** it with other materials such as **wire mesh or steel rods**. The compressive strength of **concrete** (matrix) is greater than its tensile strength. This means that it can withstand more force from crushing than it can force under tension. **Steel** (reinforcement), on the other hand, has greater tensile strength. This means that by combining the two materials, one is created that is both strong under tension and strong under compression. This makes reinforced concrete an important material in the construction of large buildings.

Barriers to Prevent Rusting

There are several different methods that are used to prevent rusting.

1. painting
2. coating with plastic
3. oiling and greasing

Electroplating

To improve the appearance of metal or to prevent corrosion, a thin layer of a metal can be applied to an object using electrolysis. This process is called **electroplating**.

In electrolysis, there are two electrodes – the **positive anode** (plating metal) and the **negative cathode** (the iron or steel object). The **electrolyte** is the solution that contains the metal ions needed to plate the metal. For example, cutlery made of steel can be electroplated with silver.

Sacrificial Protection

Metals such as iron can be **prevented** from rusting if they are put into contact with **more reactive metals** such as zinc. The reactive metals will react more readily with oxygen whilst iron does not corrode.

We say that the more reactive metal has '**sacrificed**' itself. Once the more reactive metal has corroded away, it can simply be replaced.

Galvanising

Galvanisation is the process of coating iron with zinc. The purpose is to **prevent** oxygen and water reacting with iron and so prevents **rusting**. Zinc acts as a **sacrificial** metal.

Alloys

Name of Alloy	Component Metals	Uses
bronze	copper and tin	bells coins statues
brass	copper and zinc	locks taps instruments door hinges door knobs
gold	Alloyed with other metals such as silver, zinc and copper.	jewellery

Steel Alloys

Steel is an **alloy** made up of **iron** mixed with certain amounts of **carbon**. Different steels have different properties and this determines their use.

- **High-carbon steel** contains a **high proportion of carbon**. This type of steel is **strong and brittle** and is used in the construction industry.
- **Low-carbon steel** contains a **low proportion of carbon** and is softer and more **easily shaped**. This makes it useful for making car body panels.
- **Stainless steel** is made up of **iron** but also the elements **chromium** and **nickel**. It is used for making **cutlery** as it does not rust.

Glass

Glass is made by **melting** a mixture of **sand** (silicon dioxide), **limestone** and **sodium carbonate**. Once it has melted, the molten liquid then cools and solidifies. Glass made with this mixture of ingredients is called soda-lime glass. **Soda-lime glass** is used for window panes, glass jars and bottles.

Glassware that is used in **baking** and in the **laboratory** contains boron trioxide. **Borosilicate glass** has a **higher melting point** than soda-lime glass which makes it better suited to its function where high temperatures are often used.

Ceramics

Ceramics made from **clay** include china, porcelain and brick. Wet clay is shaped and then placed into a furnace where it is heated to a **high temperature**. Crystals form in the clay and join it together.

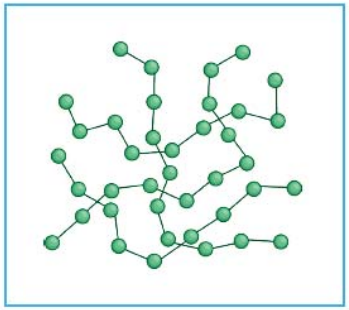
Dinner plates and bowls are made from clay ceramics. Once taken out of the furnace, the ceramics are allowed to cool and are coated with a glaze. This glaze hardens over time and forms a waterproof layer.

Polymers

Polymer properties are dependent upon the **monomer** that it is made from and the conditions in which it was made. For this reason, different polymers have different jobs. For example, **low-density** (LD) and **high-density** (HD) poly(ethene) are made from the monomer ethene using different catalysts and reaction conditions. Low-density poly(ethene) LDPE is flexible and is commonly used in carrier bags and bubble wrap. High-density poly(ethene) HDPE is much stronger, flexible, resists shattering and chemical attack. It is commonly used in plastic bottles, pipes and buckets.

Thermosetting and Thermosoftening Plastics

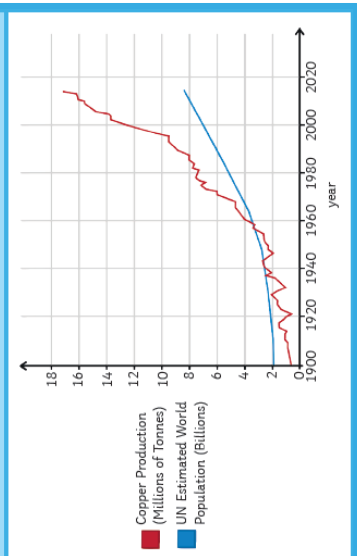
The polymer chains in **thermosetting plastics** are held together by strong **covalent bonds**. This means that plastics in this group can withstand **higher temperatures** and do not melt when heated – they have **high melting points**. Thermosetting plastics are used to make electrical plugs. Even if there is a fault and the wiring becomes hot, the plastic casing will not melt.



Year 11 TRIPLE SCIENCE ONLY – Term 1

Chemistry C10 – Using resources

Haber Process and Copper



Scientists often discover new ways to produce a product; **synthetic methods** of production replace **natural methods**. For example, fertilisers were obtained from manure (a natural resource).

The **Haber process** allowed the synthetic production of **fertilisers** and this enabled **intensive farming** methods to spread across the globe. In turn, this supported the growing human population.

Copper is another resource that has been exploited over time. As the human population has increased since 1900, the demand for copper has also increased. Copper is a finite resource which means that there is a limited supply.

Ammonia

Ammonia has the chemical formula NH_3.

Ammonia produces the ammonium ion NH^{4+} when it is involved in neutralisation reactions. Ammonia is an alkali. Oxidation of ammonia produces nitric acid HNO_3; nitric acid is the source of the nitrate ion NO^{3-}.

alkali + acid ⟶ salt

ammonia + nitric acid ⟶ ammonium nitrate

$NH_3 + HNO_3 \longrightarrow NH_4NO_3$

In aqueous solutions:

ammonium hydroxide + nitric acid ⟶ ammonium nitrate + water

$NH_4OH + HNO_3 \longrightarrow NH_4NO_3 + H_2O$

Mining

The raw materials for fertilisers need to be mined. The minerals needed to make fertilisers are extracted from the **earth's crust**.

Potassium chloride and **potassium sulfate** are a source of potassium ions and are used as fertilisers. **Phosphate rock** is **insoluble** and so cannot be used in fertilisers, but it does contain **phosphorus** which when reacted with acid, will produce **soluble compounds**.

Phosphate rock when reacted with **nitric acid** produces calcium nitrate and phosphoric acid.

Phosphate rock when reacted with **sulfuric acid** produces a mixture of calcium sulfate and calcium phosphate which is called single superphosphate.

Phosphate rock when reacted with **phosphoric acid** produces calcium dihydrogen phosphate also called triple superphosphate.

Ammonium Sulfate

The salt ammonium sulfate ($(NH_4)_2SO_4$) is used as a fertiliser and is made when ammonia and sulfuric acid react.

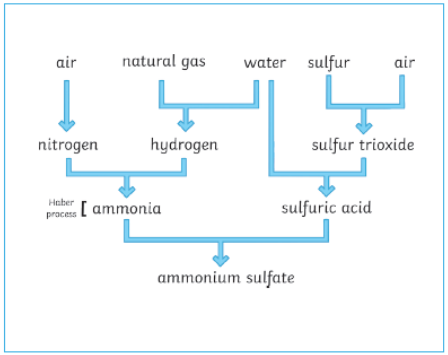
ammonia + sulfuric acid ⟶ ammonium sulfate

$2NH_3 + H_2SO_4 \longrightarrow (NH_4)_2SO_4$

Chemical Industry

To make sulfuric acid, sulfur, air and water are needed.

Sulfur first reacts with oxygen to produce sulfur dioxide. The sulfur dioxide further reacts with oxygen at a temperature of 450°C to produce sulfur trioxide. This in turn reacts with water to produce sulfuric acid.



In the Laboratory

Ammonium sulfate is produced by reacting ammonia solution with sulfuric acid.

Stage 1 – A measured amount of ammonium sulfate solution is poured into a conical flask.

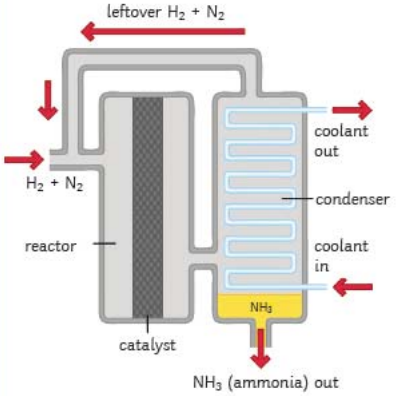
Stage 2 – Two to three drops of the indicator methyl orange is added. The ammonia solution will turn yellow as it is an alkaline.

Stage 3 – The conical flask is placed under a burette containing sulfuric acid. Slowly the sulfuric acid is added to the flask until the indicator turns orange. If the indicator turns red, this means that too much acid has been added.

Stage 4 – Once the solution turns orange, the volume of acid that was added is recorded and the neutral ammonium sulfate solution containing the indicator is discarded.

Stage 5 – The experiment is then repeated with the same volumes of sulfuric acid and ammonia solution, but this time the indicator is not added. The solution is then heated and the water evaporates leaving behind crystals. The crystals left in the evaporating basin are then placed in an oven.

Haber Process



The Haber process is used by the chemical industry to synthesise **ammonia**. Ammonia is used in the production of fertilisers, dyes and explosives.

The reaction is a **reversible** one and involves nitrogen reacting with hydrogen to produce ammonia. As the reaction is reversible, some of the ammonia will decompose back into nitrogen and hydrogen.

$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

The reaction mixture is cooled, the ammonia liquifies and is then removed. The hydrogen and nitrogen that has not reacted is recycled to increase the efficiency of the process. The reaction reaches **dynamic equilibrium** and this is where the rate of the forward reaction occurs at the same rate as the backward reaction.

In the Haber process, nitrogen and hydrogen are pumped through pipes at a pressure of **200 atmospheres**.

Nitrogen is obtained by extraction from the air and hydrogen is obtained from natural gas. The gases are passed through a tank containing a **catalyst** (iron); catalysts speed up the rate of a chemical reaction without getting used up themselves. The gases are heated to **450°C** as they pass through the tank.

The reaction mixture is allowed to cool and this allows the ammonia to turn from a gas to a liquid. Once this has happened, the ammonia is removed. Any unreacted nitrogen and hydrogen is then recycled.

Fertilisers

Fertilisers contain lots of **mineral ions** that are key to the growth of healthy crops. Plants absorb these minerals through their root hair cells; these mineral ions need to be replaced and so farmers need to add fertiliser to the soil in order to replace the lost mineral ions.

Farmers often use **NPK fertilisers**. These are fertilisers that contain the elements **nitrogen, phosphorus and potassium**.

- Ammonium nitrate - NH_4NO_3 - and ammonium sulfate - $(NH_4)_2SO_4$ - are examples of fertilisers that contain the essential element nitrogen.
- Ammonium phosphate - $(NH_4)_3PO_4$ - contains the elements nitrogen and phosphorus.
- Potassium nitrate - KNO_3 - contains the elements potassium and nitrogen.

Year 11 TRIPLE SCIENCE ONLY – Term 1

Chemistry C10 – Using resources

The Advantageous and Disadvantages of Industrial vs Laboratory Method of Fertiliser Production

Industrial Method

The industrial method of production requires a temperature range between 60-450°C, depending on the stage in the production process. As this is a **continuous method** of production, it requires the use of expensive machinery. The starting materials in this method are acquired from **raw materials** with **large quantities** of fertiliser being made **quickly**. The cost of labour is reduced by using **automated mechanisms** and machines.

Laboratory Method

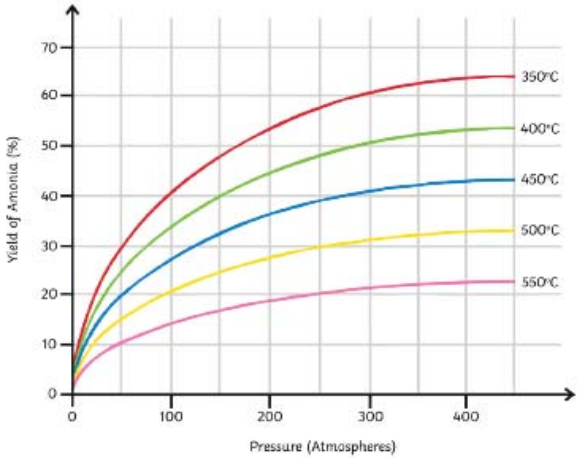
The laboratory method, on the other hand, is much **slower** and more **labour intensive** and this makes the **running costs high**. The starting materials for this method are purchased directly from a chemical supplier. As this is a batch process, the **equipment** used is **relatively cheap**. A Bunsen burner is used for heating and room temperature is required for the neutralisation stage.

Haber Process – Higher Tier Only

The graph shows that as the temperature increases, the yield of ammonia decreases.

Increasing Temperature

As the temperature increases, the **equilibrium** position moves to the **left** and the **yield** of ammonia **decreases**. Using a low temperature may seem the most sensible option, but if the temperature is too low then the rate of reaction will also be reduced. That is why the temperature that is chosen is a **compromise** between the **yield** and **rate of reaction**.



Increasing Pressure

In a reaction where gas particles are reacting or produced, increasing the pressure will **shift** the **equilibrium** position to the side with the **fewest moles of gas**.

In the Haber process, the right-hand side of the equation has the fewest number of molecules; if the pressure is increased, then the equilibrium position will shift to the right and the yield of ammonia will increase. The disadvantage to using higher pressures are that more expensive equipment is required to cope with the increased pressure and this increases energy costs. The decision here is a **compromise** between **yield** and **cost**.

Catalysts

Catalysts are useful in the Haber process as they **speed** up the rate of reaction in both directions. The time taken for the system to reach **equilibrium** is reduced. A catalyst does not affect the position of the equilibrium or the yield. Using a catalyst allows a low temperature to be used whilst also keeping the yield high.

Reducing Cost

Any unreacted hydrogen and nitrogen are recycled back into the reactor and this reduces the cost of making raw materials. Energy is a large cost. Often, exothermic reactions where energy is released are used to heat up other parts of the process.

Sacramental Nature of reality means that God is present in all of creation and can be understood through the things he has made.

Sacraments are ways that we can receive God's grace. This is a reason that each sacrament is important.

Baptism is important because it washes away original sin, welcomes us into the Church, allows us to receive other sacraments, the Catechism teaches it and Jesus did it.

Confirmation is important because it makes a person a full member of the Church, allows people to take on lay ministries, allows us to renew our baptismal vows and gives the gifts of the Holy Spirit.

Reconciliation is important because a person's sins get forgiven and our relationship with God is strengthened.

Anointing of the Sick is important because it gives people strength to face illness, absolves a person's sins and they also receive Holy Communion during the sacrament.

Marriage is important because it shows love, commitment to staying together for life, is where children are meant to be had and raised.

Holy Orders is important because without priests, bishops and deacons we cannot receive sacraments which help us gain salvation.

For Eucharist see Liturgical Worship.

Divergent views

Most Protestants only have two sacraments, Baptism and the Eucharist, because they were instituted by Jesus.

Quakers and Salvation Army have no sacraments because they don't think they belong to the new law of Jesus.

Baptists don't get baptised as babies but rather as adults following Jesus.

GCSE Religious Studies

Unit 1.2 Practices

Remember that you need to be able to refer to sources of Wisdom and Authority. The sources for this unit are overleaf.

Catholic Mission and Evangelism

Evangelisation is spreading the message of Christianity with the aim of converting people to Christianity.

Jesus' final words to the disciples, known as the Great Commission, was to go make disciples of all the nations so that is what Christians should do.

The early disciples evangelised by travelling to different countries and writing letters to spread the word of God.

Then when Christian countries colonised other countries they brought their religion to them.

Missionary and evangelical work is carried out today through:

- **Through local churches offering mass and sacraments.**
- **Different churches working together**
- **The Pontifical Council that promotes new evangelisation through the media and social media.**

Catholic Liturgical Worship

Liturgical worship is worship that uses set prayers and rituals, eg. Mass which includes these stages at all Masses.

- **Penitential Rite**—Where we say sorry and have sins forgiven.
- **Liturgy of the Word**—Where we hear Bible Readings, Gospel and Sermon. These help us to live a good Christian life.
- **Liturgy of the Eucharist**—The priest blesses the bread and wine like Jesus did at the Last Supper and it becomes the Body and Blood of Christ.
- **Rite of Communion.** The congregation receive Jesus' body and blood.
- **Final Blessing**—Give thanks for what we have received and remind us to live Christian lives

Non conformist Churches use non liturgical worship where they have hymns/ gospel songs, unprepared prayers and have an emphasis on the sermon.

Forms of Popular Piety

Popular Piety includes the Rosary, Eucharistic Adoration and Stations of the Cross.

Rosary—A set of prayers that allow Christians to reflect on the life of Jesus, reminding them of what he has done for us.

Eucharistic Adoration— Catholics show adoration towards the Eucharist as it is exposed on the altar in a monstrance. Identifies with Jesus' suffering, allows us to be in the presence of Christ and allows us to give thanks to Jesus.

Stations of the cross—Images of Jesus journey from his trial to his body being put in the tomb. Reminds us of the suffering of Jesus and gives an opportunity to thank Jesus for this.

Catholic Social Teaching

Catholic Social teaching is all about how we treat others and the world around us. It is based on:

- Jesus' command to love your neighbour
- The Bible and Catechism teachings to be just.
- The Parables of the Sheep and Goats and the Good Samaritan
- Laudato Si'– Pope Francis' letter on how to treat the world.

The Society of Saint Vincent de Paul (SVP) is an organisation that helps the poor and suffering in the UK by:

Visiting the lonely, running camps for children from broken homes, providing furniture stores to help the homeless, providing drop in centres for lonely people to socialise.

CAFOD are an organisation that helps the poor and suffering overseas by:

Providing long term aid so people can support themselves , helping in times of disaster such as earthquakes etc, speaking out on behalf of the poor communities and promoting fair trade products.

Funerals

There are 3 stages to a funeral.

- **A vigil service**—Takes place the night before the funeral. The have prayers and a service of the word.
- **The funeral liturgy**— Can be a Mass . Is a reminder that death is not the end. Pray that the person will not suffer but go quickly to heaven.
- **The rite of Committal** - At a cemetery or crematorium. Coffin sprinkled with holy water and lowered into the ground. Prayers of farewell said.

A Catholic funeral reminds people that they are still linked with the deceased through Christ. It is a celebration of the person's life and also reminds us that Jesus died so we could gain entry to heaven.

Prayer—Communicating with God.

Thanks—People pray to thank God for the things we have received.

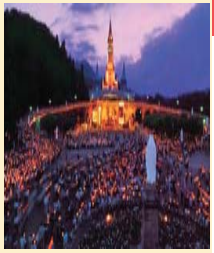
Asking—People pray to ask God for help in times of need.

Praise—People pray to praise and adore God for every-thing that he has done for us

Sorrow—People pray to say dory for the wrongs they have done and ask for forgiveness.

When Catholics pray they want a relationship with God, they follow what Jesus told them to do and follow the Catechism. You can pray in lots of different ways and it follows Jesus' command to Love God.

Pilgrimage is a journey to a religious place.



Catholics go on pilgrimage to become closer to God, be cured from illness or to see places where saints or Jesus were.

- **Jerusalem**– This is where Jesus spent his life. People go to see the areas where Jesus was buried and rose from the dead etc.
- **Rome**—This is where the HQ of the Church is and where the Saints Peter and Paul are buried.
- **Lourdes**— Where Mary appeared to St Bernadette and 6 million Catholics go. Many healing miracles recorded here

Protestants feel pilgrimage is unnecessary because God is everywhere so you don't need to go to a special place to get closer to him.

Practices

Sources of Wisdom and Authority

	Topic	Quote/Reference	Source
1	**Sacramental nature of reality**	Baptism, Confirmation and the Eucharist are necessary for full Christian initiation.	Catechism
2	**Liturgical Worship**	The Eucharist is the source and summit of the Christian life.	Catechism
3	**Catholic Funeral Rite**	The Requiem Mass is the highest form of prayer; the soul of the deceased is commended to God.	Cardinal Vincent Nicholls
4	**Prayer**	Prayer is the raising of the heart and mind to God.	Catechism
5	**Popular Piety**	The rosary is important because it helps Catholic meditate on Jesus' life.	Catechism
6	**Pilgrimage**	Pilgrimage can strengthen faith.	Catechism
7	**Catholic Social Teaching**	The world must listen to the cry of the earth and the cry of the poor.	Pope Francis *Evangelii Gaudium*
8	**Mission and Evangelisation**	Jesus said "Go make disciples of all nations."	Matthew's Gospel

Knowledge organiser: Sources of Wisdom and Authority

Revision EXAMPLE	Self-quizzing
1. THE BIBLE WORD OF GOD Biblia – books – collection of books. Catholic Bible 73 books. OT was written over 1000 years. NT written in 70yrs. Inspired by God. STRUCTURE OT and NT. Testament – Covenant a binding promise. Torah – the Law. NT covenant sealed with the blood of Christ on the cross. OT: Torah – first 5 books, the Law – Decalogue. Jews 613 laws. Christians – do not follow this as the new law (Jesus) replaced the old law.. History Genesis Moses and Israelite history. Prophets – had a message from God for the people about what God was like and how to behave. Writings – psalms and literature NT: Gospels, life and teachings of Jesus and first apostles. Gospel – Good News. Letters –Paul, Peter, Jude James and John. Written to encourage and instruct the early Christians DIVERGENT CHRISTIAN UNDERSTANDINGS Council of Carthage agreed the 27 books of the NT. Bible translated into Latin by St Jerome. Protestants believed the Greek translation was unreliable . Protestant Bibles only have 39 OT books where Catholic has 47 **The New Testament lies hidden in the Old and the Old Testament is unveiled in the New (St Augustine of Hippo)**	1. What is the Decalogue? 2. Which translation does the Catholic Church accept? 3. What does Bible mean? 4. What is a covenant? 5. Why do Christians and Catholics have different Bibles?

Knowledge organiser: Sources of Wisdom and Authority

Revision	Self-quizzing
2: INTERPRETATION OF THE BIBLE **Bible inspired:** by the Holy Spirit – so it comes from God. God speaks through the Bible so it should be followed. Bible contains Gods laws on how to behave. **Interpretation of the Bible:** The interpretation of the Bible for Catholics comes from: Apostolic Tradition (set up by the first apostles) Magisterium (council to decide Church teaching) Catechism (all the Church teachings) Papal encyclicals (letters from the Pope) Bishops letters Priest sermons **Different Interpretations of Biblical authority:** **Fundamentalist Christians:** Bible is the Word of God literally, written by people who were told directly from God what to write. All Bible is truth **Conservative Christians** the Bible is the revealed word of God but not his actual words. The writers were inspired by God but used their own ideas. **Liberal Christians:** Bible is the words about God not from God. People wrote in their own special way after experiencing God. There are mistakes and contradictions, but the Bible still holds truth. **Bible gives guidance and teaching** Because it is inspired by the Holy Spirit.. It reveals God. Contains Gods laws how to behave. Contains the teachings of Jesus.	1. Give three different interpretations of Biblical authority 2. Why is the Bible a source of guidance and teaching? 3. What is the Magisterium? 4. What is an encyclical? 5. "All scripture is God breathed" Timothy
3: SCRIPTURE TRADITION AND MAGISTERIUM **Apostolic Tradition** – handing on the Gospel teachings by the first apostles direct from Jesus. **Important because:** the Church has authority from Jesus, Church teaching has remained the same over time, the teaching is correct true faith. **Apostolic Succession** – Jesus gave Peter authority to lead the Church, passed on through the Popes meaning the teachings from Jesus remained unchanged. **Important because:** the Pope has the same authority today that Jesus gave Peter. When teachings come from the Pope and Bishops from the Magisterium, they speak as the Apostles successors. **Magisterium:** Pope and Bishops interpret the Bible and Apostolic Tradition for matters of faith and morals today. **Ordinary Magisterium** – bishops teach the Church teachings. **Conciliar Magisterium** – Pope calls a general council to decide teachings. **Pontifical Magisterium** – Pope makes the decision on doctrine. **Importance:** no higher authority, gives answers such as same-sex marriage, gives clear guidelines on how to behave. **Pope:** leads the worldwide church, organizes the magisterium, appoints new cardinals, gives guidance on current issues.	1. Explain the three levels of the Magisterium 2. Why is the Magisterium important for Catholics? 3. Explain Apostolic Tradition 4. Explain Apostolic Succession 5. The task of interpreting the word of God has been given entrusted solely to the Magisterium.' Catecbhism

Knowledge organiser: Sources of Wisdom and Authority

Revision	Self-quizzing
4: THE SECOND VATICAN COUNCIL: Called to: bring the Church up to date, open the Church to 'the wind of the Holy Spirit,' bring church leadership closer to the people. **Sacred Council (Sacrosanctum concilium0** - New rite of Mass and language in home language - Laity to read from the Bible - Priests to face the people. **Light of Humanity (Lumen Gentium)** - Circular church rather than triangular hierarchy. Joining all people together. - Common priesthood, every Christian is called to serve Christ, not just priests. - Ordained Priesthood celebrates the sacraments. **Joy and Hope (Gaudium et spes)** - Human rights and dignity for all - Concern over moral values in a changing world. - Peace and justice necessary for everyone - Talks with atheists and secular groups to act together for social change. **The Word of God Dei Verbum** Bible written in home languages Catholics to read the Bible and apply to own lives. **Different understandings:** Many were encouraged by the 2VC opening to the modern world. Some thought it was too radical and some thought it wasn't radical enough as they wanted married priests, flexibility with contraception and divorcees to take communion. Each document is a source of wisdom and authority.	1. Explain three documents from the second Vatican council. 2. Why is the second Vatican council important to Catholics? 3. Who are the laity? 4. Why did Catholics have differences of opinion about the changes made in the second Vatican council? 5. Give three changes from sacrosanctum Concilium
5: THE CHURCH AS THE BODY OF CHRIST AND THE PEOPLE OF GOD: **Body of Christ:** this means that all Christians carry on Christ's work on earth. Christians are united with each other and Christin Baptism- members of Christ's body. Receive the Body of Christ at Mass, joining with all Christians around the world. Body of Christ means that all members of the Church work together, there is no division in the body. **Importance of the Body of Christ:** This is how the Church is described in the NT Christ did not leave the earth, he remains in the Church The Church carries on Christs work on earth Christians form one body and are united together Shows the importance of the Eucharist at Mass Christians have different gifts and talents but all come together united as Christ's body. **People of God:** God called the Jews to be his people, now, through Christ, God has called the united Body of Christ, the people of the Church to be his people. **Different understandings:** **Catholics:** authority of the Pope, pope's role to guide the Church and pass on Christ's teachings **Orthodox:** reject the Pope, authority comes from the Patriarchs together. **Protestants:** Bible is the sole authority **Ecumenical Movement** – working together to unite all Christians though 'Churches Together.' Christians are one body in Christ. St Paul	1. Give three meanings of the Body of Christ 2. Why do Christians call the Church the Body of Christ? 3. Who are the laity? 4. What is Churches Together? 5 Explain different views of the leadership and authority of the Church

Knowledge organiser: Sources of Wisdom and Authority

Revision	Self-quizzing
6: THE FOUR MARKS OF THE CHURCH **Nicene Creed – see quote** **The Church is ONE:** based on One Lord Jesus Christ. One Baptism, Inspired by one Spirit. Church has one faith **Church is HOLY:** God made the Church, it belongs to God so it's holy. Christ gave his life to make the Church holy. Church is the source of the sacraments, bringing God's grace and is therefore is holy. Church is the true faith guided by the HS – Holy. **Church is Catholic – Universal:** Jews are for one race, the Catholic Church is world wide. Christ's message is for everyone. Message to be understood and there for everyone. **Church is Apostolic:** Church was founded by the apostles. It received apostolic Tradition so the Church teaches what the apostles taught. Bishops are the successors of the apostles. Authority of St Peter is passed on by Apostolic Succession to the current Pope. **Importance:** only one faith which continues today. Church is worldwide. Church goes back to the apostles. Church is holy, from God. **Differences: Protestants** – based on the Bible and the creed. The Church is apostolic as its based on the Bible.. **Catholics** – based on the creed and the Catechism. Church is apostolic through apostolic tradition and the unbroken line of Bishops. I believe in one, holy, Catholic and apostolic Church.'	1. What are the four marks of the Church? 2. Why is apostolic succession important for Catholics? 3. Explain apostolic tradition 4. What is a creed? 5. What is the definition of the word Catholic?
7: MARY AS A MODEL OF THE CHURCH: she gave Christ to the world. She was the mother of Christ and so the mother of the church.. Mary's assumption to heaven means all faithful will go to heaven. **Mary is the model of discipleship:** she obeyed God's plan, said yes to God. She was the immaculate conception, conceived without sin and remained sinless. She showed devotion to Jesus to the end on the cross. **Mary is an example of faith:** she believed the Angel Gabriel at the annunciation. She believed Jesus was the Son of God through the Angel Gabriel's words. She trusted God that death was not the end when Jesus died. **Mary is an example of charity:** she gave up her own life to bear God's son. She was always ready to help others. She prays for those who need help. **Importance:** Her immaculate conception meant that Jesus was also sinless and his Father was God. Virgin birth means she gave birth to God so she is the Mother of God. Mary was assumed to heaven instead of dying. In heaven she prays for the souls on earth. "I am the Lord's servant, let your will be done." Gospels.	1. Outline three beliefs about Mary 2. Explain why Mary is the model of discipleship 3. Explain the immaculate conception 4. Explain the assumption 5.

Knowledge organiser: Sources of Wisdom and Authority

8: SOURCES OF PERSONAL AND ETHICAL DECISION MAKING

Sources of guidance when making moral decisions:

The example and teaching of Jesus:

Golden Rule:

Greatest Commandment:

Jesus fulfilled the Law of Moses in the New Law of Christ – summed up in the Sermon on the Mount, based On loving God and loving your neighbour.

Natural Law: the moral order designed by God at the creation so people work in harmony with natural law. An example of natural law is a man and a woman marrying and having children to continue the human race., Therefore the church cannot agree with same sex marriage as they say it is against natural law.

Conscience: . The voice of conscience is the voice of God. St Paul and St Thomas Aquinas taught that Christians should use their conscience as the final part of decision making. Although some doubt about relying on conscience because people can mistake the voice of God and could mistake their conscience.

Teachings of the Church: The magisterium is an authority and guides as it is given by the Pope and Bishops and inspired by the Holy Spirit.

Implications for Christians today: Christians often use more than one authority when making a moral decision.
Jesus teachings don't speak about modern issues eg contraception
Some use their conscience and go against church teachings on issues such as same sex marriage or condoms.
Others use Jesus authority and reject their conscience.

1. Give three sources of personal and ethical decision making

2. Why is natural law important to Catholics?

3. What is the Golden Rule?

4. What is the Greatest Commandment?

5. Why might some Catholics listen to conscience and some Catholics don't