Wadham School

A Church of England Community School

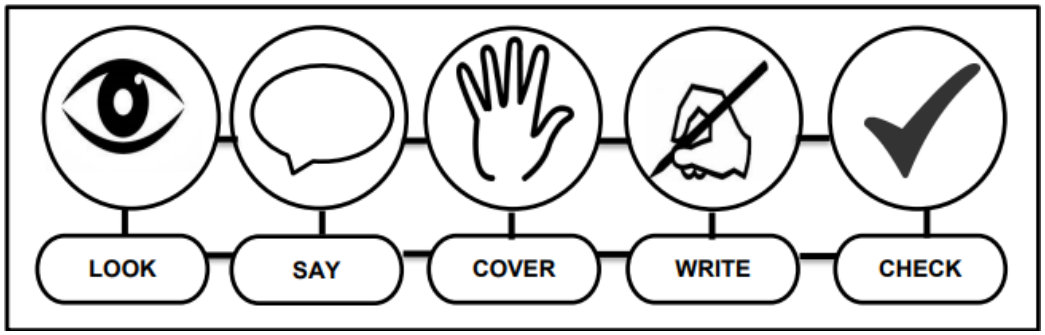
Knowledge Organisers
Year 10
Term 3 & 4
2025-2026

Name.....

Tutor group.....

"Life in all its fullness" John 10:10

Using Your Knowledge Organiser



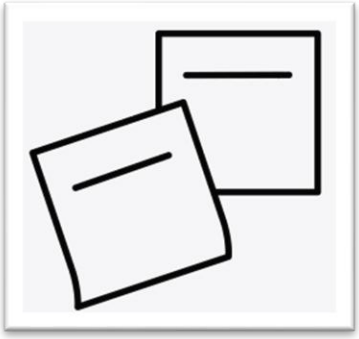
Look-Say-Cover-Write-Check

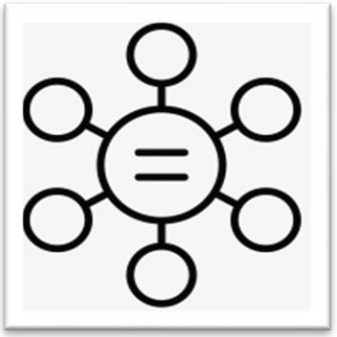
Retrieval practice using the look-say-cover-write-check technique, when done in regular small chunks, is one of the best ways you can learn relevant knowledge over time.

Working in Independent mode:

- Look at the first bullet point or sentence
- Read through it three to five times
- Cover
- Write it out exactly
- Remove and check what you wrote and tick if correct
- Repeat
- When you get it 100% right, move on to the next chunk of information

Flash Cards	**Self Quizzing**	**Mind maps**
Make flast cards with the definition on one side and key word on the other.	Write quizzes with answers to test yourself in the future.	Create mind maps linking key information you need to remember.





LIBRARY INFORMATION

Library Reward Card

For terms 3 and 4 receive a stamp every time you read a book from the library. Prizes to be earned along the way. See posters in the library for more details.

DON'T FORGET

Friday lunchtime is LEGO club in the library

IF YOU LOOSE A BOOK, DON'T PANIC! IT CAN BE REPLACED WITH ANOTHER BOOK OR WITH A SMALL CHARGE.

DID YOU KNOW THE LIBRARY CATALOGUE CAN BE FOUND ONLINE? THERE IS A LINK ON ALL SCHOOL COMPUTERS AND ON TEAMS. (THE LOG IN IS THE SAME AS YOUR SCHOOL EMAIL AND PASSWORD)

THE LIBRARY IS OPEN TO ALL.
IT IS A SAFE SPACE WHERE YOU WILL ALWAYS FIND AN ADULT AT BREAK OR LUNCH.
THERE ARE TABLETS IN THE LIBRARY THAT CAN BE USED FOR COMPLETION OF HOMEWORK, PLEASE ASK MRS GEORGE FOR ACCESS.

GCSE Fine Art Knowledge Organiser

To succeed in GCSE Fine Art, students must demonstrate the four assessment objectives across their portfolio.

Assessment Objective 1 (AO1)
Develop Ideas Through Investigations

What it means:
Students must research, explore and analyse a range of sources to develop ideas. This research should inform the creative journey.

How to evidence AO1:
- Mind maps, thought showers
- Artist analysis (content, style, media, purpose)
- Collecting references & contextual images
- Photographs, drawings from observation
- Notes explaining how research influences ideas

Assessment Objective 2 (AO2)
Refine Work Through Experimentation

What it means:
Students should explore and test different media, materials, techniques, and processes, showing purposeful refinement.

Ways to evidence AO2:
- Media testing (ink, paint, collage, print etc.)
- Exploring mark-making
- Practical experiments with 2D & 3D forms
- Comparing materials and selecting the most effective
- Developing samples that refine style, technique, or intention

GCSE Fine Art Knowledge Organiser

To succeed in GCSE Fine Art, students must demonstrate the four assessment objectives across their portfolio.

Assessment Objective 3 (AO3) Record Ideas, Observations & Insights

What it means:
Students must record through drawing, photography and annotation in a meaningful, purposeful way.

Recording can include:
- Observational drawing
- Drawings showing development
- Camera studies / photo shoots
- Diagrams, thumbnails, composition plans
- Notes explaining decisions, changes and insights

Assessment Objective 4 (AO4) Present a Personal, Meaningful Response

What it means:
Students bring ideas together into a final response that clearly realises their intention.

A personal response may be:
- A fully resolved outcome
- A series of pieces / developments
- A digital outcome

AO4 should show:
- Clear intention
- Connection to AO1, AO2 & AO3
- Understanding of visual language (composition, colour, tone, form etc.)

Beliefs and World Views

Beliefs and Worldviews – Year 10 Term 3 & 4

Topic 2: Ethical Issues in War and Conflict

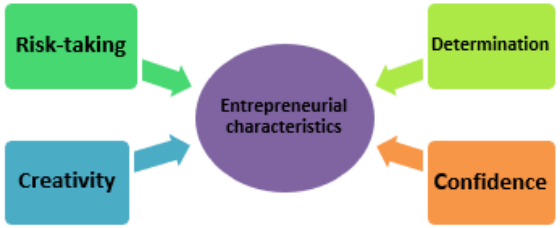
1	1	**Just War**	Criteria to determine if war is the right course of action
	2	**Just Cause**	War can only be fought if there are good reasons e.g. protect against invaders, or defend the weak and oppressed
	3	**Legitimate Targets**	Non civilian targets cannot be impacted by war
	4	**Reasonable Force**	Only use enough force to win – not to destroy in excess
2	5	**Territorial Disputes**	War fought over land and resources
	6	**Ideological Conflict**	Wars fought to prove the strength of an ideology
	7	**Holy War**	War fought over religion or belief (Only 7% of all wars have been Holy)
3	8	**Conventional Warfare**	Warfare fought with traditional weapons – Expensive and high casualties
	9	**Apocalyptic Warfare**	Warfare fought with Weapons of Mass destruction – Very high casualties
	10	**Technological Warfare**	Warfare fought with modern technologies – Can minimize casualties
4	11	**Pacifism**	Belief that war is not the right course of action
	12	**Desmond Doss**	Famous Pacifist who received the Medal of Honour
5	13	**Liberation**	Freedom
	14	**Theology**	Belief about God and Gods Will
	15	**Liberation Theology**	Belief it is God's will to free the captive and the oppressed
6	16	**Extremism**	Extreme political or religious views
	17	**Terrorism**	Illegal use of violence to cause fear. (Attempt to force political change)

Topic 3: Ethical Issues in Human Rights

1	1	**Human Rights**	A right or freedom given to every person
	2	**Examples:**	Right to: education, privacy, free speech, a fair wage, religion,
	3	**Universal Declaration**	List of Human Rights created by the UN
	4	**United Nations**	Group of nations working together to improve life around the world
2	5	**Equality**	Human rights are for all people, equally.
	6	**Liberal Freedoms**	How free and open a country is
	7	**Examples**	Switzerland = Very high, Sudan = Very low
	8	**Capitalism**	Social system focused on private wealth
3	9	**Prejudice**	Judging someone as inferior based on race, gender, religion etc.
	10	**Discrimination**	Treating someone differently due to prejudice
	11	**Anti Semitism**	Prejudice towards the Jewish religion
	12	**Islamophobia**	Prejudice towards the Islamic religion
4	13	**Racism**	Prejudice and Discrimination against people of different races or nationalities
	14	**Black Lives Matter**	Modern group aiming to bring greater equality and challenge racism
5	15	**Censorship**	Government use of control over media
	16	**Free Speech**	Right to able to promote your views and beliefs without restriction
	17	**Fake News**	False Information on the internet – censorship can restrict it
6	18	**Democracy**	Rule by the People – The right to choose elected leaders
	19	**Political Party**	Group with ideological beliefs for the better of society
	20	**Manifesto**	Set of political policies designed to win votes.
	21	**Conservative**	General term that refers to 'traditional' political ideology
	22	**Progressive**	General term that refers to 'modern' or 'liberal' ideology

1:1 Role of Business Enterprise and Entrepreneurship

Enterprise is: Seeing an opportunity to provide a product or service that people are willing to buy



Risk	Reward
▪ **Financial** Possibility of losing money ▪ **Health** The strain of being in charge can affect health ▪ **Strained relationships** Starting a business is time consuming	▪ **Financial** Some successful entrepreneurs can make a lot of money ▪ **Independence** Some people like to be their own boss ▪ **Self-satisfaction** Some people like to see and idea work

Entrepreneur
A person who takes the risk of starting and running a business

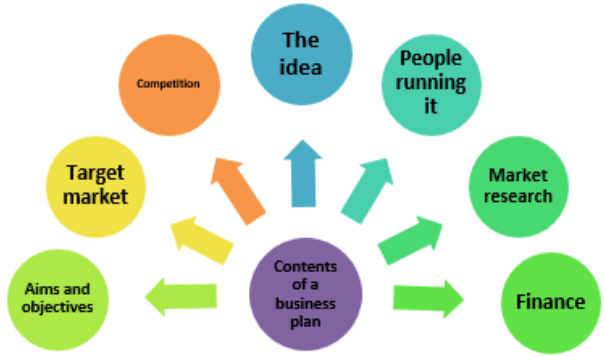
Enterprising characteristics
Features of an entrepreneur

1:2 Business Planning

Purpose of a business plan:

- To reduce the risk of starting a business
- To help a business succeed

A business plan: details how a business aims to achieve its objectives



Role of a business plan:

- Identify markets
- Helping with finance
- Identifying resources needed
- Achieving aims and objectives

Business plan
A simple plan which sets out the details of the business

Finance
The money needed to start the business

1:3 Business Ownership

Sole trader

Advantages	Disadvantages
▪ Easy to set up ▪ Little finance required ▪ Full control ▪ Keep all the profits ▪ Financial information is private	▪ Unlimited liability ▪ Business stops if ill or on holiday ▪ Long working hours ▪ Shortage of capital ▪ Skills shortage ▪ No continuity

Partnership

Advantages	Disadvantages
▪ More capital available ▪ Easy to set up ▪ More skills available ▪ Shared workload ▪ Financial information is private	▪ Shared profit ▪ Unlimited liability ▪ Shortage of capital ▪ Slower decision making ▪ No continuity

Private Limited Company (LTD)

Advantages	Disadvantages
▪ Limited liability ▪ Continuity ▪ Can raise capital more easily ▪ Control over share sale	▪ Financial information available to the public ▪ Complex and expensive to set up ▪ Sale of shares is restricted ▪ Dividends to be paid

Public Limited Company (PLC)

Advantages	Disadvantages
▪ Can raise large amounts of capital ▪ Easier to borrow money ▪ Limited liability for shareholders	▪ Possibility of a takeover ▪ Complex and expensive to set up ▪ Hard to manage as so large ▪ Financial information available to the public

Unlimited liability
Responsibility for the debts of the business rests with the owners

Capital
Money raised to start or develop a business

Deed of partnership
A document setting out the operations of the partnership

Sleeping partner
Someone who only invests in a partnership

Limited liability
Responsibility for the debts of the business is limited to the amount invested

Shareholders
Owners of a limited company

Dividend
Money paid to shareholders from business profits

Child Development

Topic area 4: Early Years PROVISION

Voluntary setting/ provision – A provision that is set up and funded by donations and contributions: charity or church run group.
Private setting – A provision that parents will need to pay for and is private: private nursery, childminders home
Statutory setting – A provision that is government funded and have to be available by law; schools.
Independent setting – A provision that is used by independent schools which are not government funded so parents will be charged for them; an independent school nursery.

Early years setting - where children's learning and development is nurtured by adults. 0-5 years, English settings only, sets standards for learning, taught through game and play, reviewed when they're between 2 and 3 (two year check), based on classroom observation, reception baseline assessment
**Childminder, school based nursey, reception class, children's centers, day nursery, out of school clubs and play centers, parent and toddler groups, playgroup/ preschool, workplace nursey, nanny/ home carer, creche

OFSTED - a government organisation that inspects different services that care for children and young people who provide educational opportunities
EYFS – Early Years Foundation Stage – this sets out the requirements for children's learning and development from birth to five years

Considerations when choosing childcare settings – location, cost, travel, opening times, facilities, policies
Barriers when choosing childcare settings – affordability, travel and accessibility, opinions, religion, lifestyle, language, mental health, area
Policies and procedures – Early years settings (EYFS) need to have policies and procedures in place to ensure the safety and well-being of children

Topic area 5:

Legislation – Set of laws passed by parliament
Framework – Standards that must be met
Policy – Action adopted by an organisation
Procedure – A way to carry out a policy

Health and Safety at work Act 1974 – Everyone working in an early years and childcare setting is responsible for maintaining a safe and healthy environment for all; ensuring that children and staff remain protected from any hazards of working or being in a nursery. eg,reporting any health and safety concerns and following health and safety policies and procedures
Data Protection 2018– Confidentiality.
GDPR – outlines how a school or setting will safely collect, store and dispose of the data you collect. GDPR's security/integrity principle means there needs to be measures in place to protect private information. Privacy would also mean to make sure to either leave them alone when they ask for it, and also to give them privacy.
United Nations Rights of the Child 1989. The UNCRC is an international agreement that protects the rights of the children and provides a child-centred framework for the development services for children. All

Child Development

children have basic needs, and it is their universal right to have these met to ensure each child in the world can develop to their full potential. A childcare provider must safeguard all children in the workplace and report any abuse, provide play, adapt activities to ensure equality and diversity.

Equality Act – This legislation protects the rights of individuals and promotes equality of opportunity. It applies to all childcare providers, including private nurseries, independent schools, and local authority establishments. The Equality Act requires early years providers to:

- Make reasonable adjustments for disabled children
- Promote equality of opportunity
- Remove physical barriers
- Treat all people equally and fairly

EYFS The EYFS is the governing body for equality and diversity in childcare. It sets standards for childcare providers to ensure children grow up in a diverse environment. The EYFS encourages staff, parents, carers, and stakeholders to:

- Be aware of and stand against racism
- Treat all people equally and fairly

To ensure equality and diversity in early years settings, practitioners can;

- Provide representation of different races, disabilities, ages, and family types
- Use role-play clothing that reflects diverse cultures
- Use household items that reflect various cultures and communities
- Have practitioners with some of the same identity features as children and families

Equality – everyone should be treated fairly and have the same opportunities, regardless of their differences.

Diversity - recognizing and valuing people's differences, including their backgrounds, knowledge, skills, and experiences

Inclusion - the policy or practice of making sure that everyone in society has access to resources and opportunities.

Confidentiality – the protection of personal information and is based on the idea that information should not be disclosed without the person's consent or legal authority. Safeguarding files at a nursery are confidential and must be kept in locked online or paper file

Safeguarding – Protecting others from harm. The act of protecting a person's health, wellbeing, and human rights, and ensuring they are free from harm, abuse, and neglect

Physical - any intentional act causing injury or trauma to another person through bodily contact.

Emotional – Psychological abuse, is the use of words and actions to manipulate, hurt, scare, or upset someone

Sexual – abusive sexual behaviour by one person upon another.

Neglect – the persistent failure to meet a child's basic physical and/or psychological needs, likely to result in the serious impairment of the child's health or development.

Whistleblowing – when someone raises the concern of about a dangerous or illegal activity or any wrongdoing within their organisation

Observation – the act of paying close attention to a child's behaviours, interactions, activities, and interests. It's a fundamental professional skill that helps childcare providers understand how children develop, learn, and progress

The three prime areas to observe in EYFS

1. Communication and language

Child Development

2. Physical development
3. Personal, social and emotional development

Fairness - the quality of treating people equally or in a way that is right or reasonable. It can also mean considering all factors that affect a situation to make a fair judgment

EAL - English as an Additional Language and refers to children who are learning English as a second language

Medical conditions/ need - A disease, illness or injury; any physiologic, mental or psychological condition or disorder; Diabetes, asthma, allergy, intolerance, might require regular medication

Disabilities - a condition that makes it more difficult for a person to do certain activities or interact with the world around them; Deafness, blindness

Special educational need – it might present itself as medical, behavioural, learning, disabilities
Children with an SEN need usually find it more difficult to learn compared to others the same age.
It can also be referred to as SEN/D – Special Educational Needs and Disabilities

SENCO - Special Educational Needs Coordinator. This person in your setting makes sure that the needs of children with SEN

EHCP - A legal document which describes a child's special educational, health and social needs. It provides childcare settings with guidance on how to meet that child's needs and how to promote development.

AQA English Language – Paper 2

Question Guidance (do the paper backwards):
Q5 – use the Presently, Personally, Publicly, Predictably frame to structure your response:
[Form feature: IF Article: headline & subheading
IF Letter: Dear Mr ???,

I am writing to you about…
IF Speech: 'Today I am here to talk to you about…']
Presently, we are like mindless addicts; preferring the heady rush of flippant fools and funny failures. Today's society is so immersed in the blizzard of triviality that [link to topic].

Personally, my own children, Edward and Alice, [link to topic]. It is easy to dismiss this as unimportant but the noxious influence of [topic] is as pervasive as it is dangerous.

Publicly, they (like so many their age) have [link to topic]. According to figures from Exeter University, over 75% of people [link to topic]. Professor Hill, who co-authored the report, stated: 'The issue with [topic] is a different kind of epidemic; causing untold damage. It is arguably worse because there is no vaccine.'

We must stop this!

Predictably, some people will… [consider opposing view] but this only perpetuates the problem. We have two options: continue with this intolerable situation or move forward to a future where we [positive link to topic]. Which would you rather choose?
[Form feature:
IF Article: do not add anything - end on the rhetorical question.
IF Letter: Yours sincerely,
[Your Name]
IF Speech: Thank you for listening.]

Q4 (16 marks, 20m) - compare writer's perspectives
Make links
Neat evidence – use precise quotations
Additional – link quotations across both sources
Language – analyse imagery, word choice and other methods
Structure and form – analyse perspective, tone and other methods
Intentions of writer – consider why it has been written and the impact on the reader
Your evaluation – consider which text demonstrates more or less of something

Q3 (12 marks, 15m) - analyse language
Imagery – always analyse this.
Neat evidence – as precise as possible – focus on word choices etc.
Additional – get a wide range of quotations
Language – analyse word choices, imagery and other methods such as metaphor, simile, personification, oxymoron, emotive language and syntax.

Q2 (8 marks, 10m) - summarise an idea across both texts
Make links, use neat evidence (borrow from Q4) and infer considering impact on reader.

Q1 (4 marks, 5m) - identify 4 true statements from a list of 8.

AQA English Literature – An Inspector Calls

Prepared introduction (learn this):

Priestley presents _____ to criticise capitalist culture within Edwardian England. As a socialist, Priestley wanted to inspire the younger generation in his WW2 audience to progress to a fairer and more equal society. Priestley crafts this through the cyclical structure to subvert the murder mystery genre so that rather than believing 'a man has to mind his own business' we realise that 'we are all responsible for each other'.

Make sure that you replace _____ with the focus of the question.

Key quotations to learn – prioritise the first 3 pairs.

1.	**'Burnt** her inside out'	**'Fire** and blood and anguish'
2.	**'unsinkable**, absolutely unsinkable'	'we're all in it – up to the **neck'**
3.	'obscene fat **carcass'**	'We are members of one **body'**
4.	'A **chain** of events'	'He's giving us the **rope** - so that we'll hang ourselves'
5.	'I'd give **thousands** - yes, thousands'	**'Millions** and millions and millions of Eva Smiths'
6.	'Look – **mummy** – isn't it a beauty?' / 'I'm sorry, **daddy'**	'Don't interfere, please, **father'** / **'Mother** - stop - stop!'
7.	'(with sharp sarcasm)...You were the wonderful **Fairy Prince**.'	'young and **fresh** and charming''
8.	'Girls of that **class**-' / 'Girls of that **sort'**	'You mustn't try to build up a kind of **wall** between us and that girl'
9.	'she was pretty and a good **sport'**	'Just used her…as if she was an **animal**, a thing, not a person'
10.	'it's better to ask for the **earth** than to take it.'	'To ask some – **questions'**

English Literature

ANALYSIS	
Argument	The writer presents [topic] to…
Neat evidence	The phrase '…' shows…
Additional	Additionally, the phrase '…' adds to…
Language	The imagery suggests…
Your evaluation	A reader may also understand...
Structure and form	Structurally, the... tone emphasises...
Intentions of writer	The writer's intentions may have been to…
Society and context	Contextually, the writer may be reflecting…

POETIC POEMS	Definition
Personification	Giving something human characteristics
Oxymoron	Contradictory phrase
Enjambment	Continuing a line of poetry
Tone	Mood or atmosphere
Imagery	Descriptive language
Contrast	Very different things put together
Perspective	Viewpoint
Onomatopoeia	Words that sound like the thing
Extended	Carrying on
Metaphor	Saying something is something else
Simile	Saying something is like something else

A PERSUADER	Definition
Alliteration	Repeating same sound at starts of words
Points	Clear reasons to add to your argument
Exaggeration	Overstating
Repetition	Saying the same thing over and over
Statistics	Using numbers to represent facts
Unique ideas	Unusual or ways of approaching an issue
Anecdote	A short story used to make a point
Direct address	Talking to the audience
Emotive language	Appealing to people's feelings
Rhetorical questions	Questions not intended to be answered.

An Inspector Calls

Key words	Definition
Capitalism	the idea of an economic system being based upon private wealth and ownership.
Socialism	a system of economic management and governance whereby everyone in society has a shared ownership or stake in the means of production, distribution and exchange.
Dramatic irony	When the audience know more than the characters, e.g. 'unsinkable' (The Titanic)
Cliffhanger	When the audience are left in suspense at the end of each act.
Lighting & props	The change of lighting at the beginning of the play; the use of the photography, the ring and the telephone.
Entrances & exits	Priestley crafts these so that characters enter or disappear / reappear at significant moments.
The Three Unities	The unity of time (the play happens in chronological order), the unity of action (one storyline), and the unity of place (one continuous setting).
Genre	The form of the play: it subverts the murder mystery and morality play genres
Stage directions	Instructions given to the actors, usually in brackets. These are worth analysing . Look particularly at how they change for some characters.

Film Studies

Film Studies – Timeline of key developments in film and film technology	
1895	First moving images (Lumiere Brothers).
THE RISE OF HOLLYWOOD	
1895 - 1927	Development of silent cinema from early short films to full-length feature films, during which period the foundations of filmmaking were established (e.g. cinematography, the principles of lighting and continuity editing and an extensive range of mise-en-scene, including location shooting).
1917	Technicolour: Technicolour Motions Picture Corp. was the first company to make a film using technicolour – 'The Gulf Between' (1917).
1920s	Gradual emergence of vertically integrated Hollywood film industry, established by 1930 into FIVE major studios (Paramount, Warner Bros., Loew's/MGM [Metro Goldwyn Mayer], Fox [20th Century Fox in 1935] and Radio Keith Orpheum [RKO]) and three minor studios (Columbia, Universal and United Artists) ... These were known as the Big 5 and Little 3.
THE DEVELOPMENT OF SOUND	
1927	Alan Crosland's 'The Jazz Singer', starring Al Jolson, is known as the first 'talkie' although only 354 words are spoken in it. Within 3 years most feature films became talkies. It is also the first film to feature a soundtrack.
1935	Rouben Mamoulian's Becky Sharp, the Technicolor Corporation's first feature length, 'three strip' colour film.
1948	Paramount court case which prevented studios from owning all phases of the production, distribution and exhibition process ('vertical integration') which led, in the 1950s, to the emergence of independent film production and agents producing films for the Hollywood studios to distribute and exhibit.
THE EMERGENCE OF WIDESCREEN TECHNOLOGIES	
1950s	Emergence of widescreen and 3D technologies as a response to the growth of television and the corresponding decline in cinema attendance.
1952	Cinerama is unveiled by film bosses who decide that size really does matter. Unfortunately, they soon find that huge pictures mean huge costs. Cinerama eventually becomes obsolete.
Late 1952	The Golden era of 3D began with the release of the first colour stereoscopic feature, 'Bwana Devil' produced by Arch Oboler.
Late 1950s	Although not the first examples, lightweight, portable cameras were produced suitable for hand-held use (which had an immediate impact on documentary filmmaking and were used by a new generation of directors in France – French 'new wave' directors).
1970s	Steadicam technology developed by cinematographer Garrett Brown (a stabilising device for hand-held cameras to keep the image 'steady' whilst retaining fluid movement). First introduced in 1975 and was first used in the 1976 film 'Bound for Glory'.

Film Studies

1990s onwards	More widespread use of computer-generated imagery resulted in a move away from filmed 'special effects' to visual effects created digitally in post-production to the computer-generated imaging (CGI) of characters in films.
THE MOVE INTO MODERN CINEMA	
1995	First CG (computer generated) feature length cartoon – 'Toy Story' directed by Jon Lasseter for Pixar Animation Studios.
2000s	Technology available to ordinary people makes significant strides due to developments with lightweight cameras and mobile phone technology, seeing a rise in 'citizen filmmaking'.
2007	Netflix – the first legal streaming service for film and TV is launched.
2010s	Successful feature length films shot entirely on I-phones now released – notable releases include 'Tangerine' (Baker, 2015) and 'Unsane' (Soderberg, 2018).
2017	Film and TV streaming and download sites such as Netflix, Sky, Amazon and Apple overtake DVD sales for the first time increasing by 23% in one year.
2018	'Avengers: Infinity War' becomes the first Hollywood film to ever be shot entirely with IMAX cameras.

Why is food prepared and cooked?
Food is prepared and cooked to:

- make the food more palatable – improves flavour, texture and appearance;
- reduce the bulk of the food;
- provide variety and interest to meals.
- Improves the shelf life of food

Methods of cooking food
The methods of cooking are divided up into groups. These are based on the cooking medium used.
They are:

- moist/liquid methods, e.g. boiling;
- dry methods, e.g. grilling;
- fat-based, e.g. frying.

Selecting the most appropriate way of preparing and cooking certain foods is important to maintain or enhance their nutritional value.

- Vitamins can be lost due to oxidation during preparation or leaching into the cooking liquid.
- Fat-based methods of cooking increase the energy (calories) of the food.
- The use of different cooking methods affects the sensory qualities of the food.

There are three ways that heat is transferred to food.

- Conduction – the exchange of heat by direct contact with foods on a surface.

Examples of cooking methods showing conduction are:

_____
_____
_____
_____

- Radiation – energy in the form of rays.

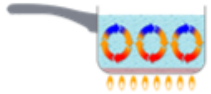
Examples of cooking methods using radiation are: _____
_____

_____
_____

- Convection – currents of hot air or hot liquid transfer the heat energy to the food.

Examples of cooking methods that use convection to cook food are:

_____
_____
_____
_____
-



Key terms
Conduction: The exchange of heat by direct contact with foods on a surface.
Convection: Currents of hot air or hot liquid transfer the heat energy to the food.
Functional ingredients: Included in food for additional health benefits.
Heat transfer: Transference of heat energy between objects.
Radiation: Energy in the form of rays.

Food science : Functional and chemical properties of Protein/Carbohydrates/Fats and raising agents

Carbohydrates perform different functions in food.
They can:
- help to cause the colour change of bread, toast and bakery products (dextrinisation);
- contribute to the chewiness, colour and sweet flavour of caramel.
- thicken products such as sauces and custards (gelatinisation)

Gelatinisation
When starch is mixed with water and heated, the starch granules swell and eventually rupture, absorbing liquid, which thickens the mixture. On cooling, if enough starch is used, a gel forms.

Maillard reaction
Foods which are baked, grilled or roasted undergo colour, odour and flavour changes. This is primarily due to a group of reactions involving amino acids (from protein) and reducing sugars.

Dextrinisation
When foods containing starch are heated they can also produce brown compounds due to dextrinisation. Dextrinisation occurs when the heat breaks the large starch polysaccharides into smaller molecules known as dextrins which produce a brown colour.

Caramelisation
When sucrose (table sugar) is heated above its melting point it undergoes physical and chemical changes to produce caramel.

Proteins perform different functions in food products.
They:
- aerate foods, e.g. whisking egg whites;
- thicken sauces, e.g. egg custard.
- bind ingredients together, e.g. fishcakes.
- form structures, e.g. gluten formation in bread;
- gel, e.g. lime jelly.

Denaturation
Denaturation is the change in structure of protein molecules. The process results in the unfolding of the protein's structure. Factors which contribute to denaturation are heat, salts, pH and mechanical action.

Coagulation
Coagulation follows denaturation. For example, when egg white is cooked it changes colour and becomes firmer (sets). The heat causes egg proteins to unfold from their coiled state and form a solid, stable network.

Gluten formation
Two proteins, gliadin and glutenin, found in wheat flour, form gluten when mixed with water. Gluten is strong, elastic and forms a 3D network in dough. In the production of bread, kneading helps untangle the gluten strands and align them. Gluten helps give structure to the bread and keeps in the gases that expand during cooking.

Gelation
Gelatine is a protein which is extracted from collagen, present in animal connective tissue. When it is mixed with warm water, the gelatine protein molecules start to unwind. On cooling, a stable, solid network is formed, trapping the liquid.

Fats perform different functions in food.
They help to:
- add 'shortness' or 'flakiness' to foods, e.g. shortbread, pastry.
- provide a range of textures and cooking mediums.
- glaze foods, e.g. butter on carrots.
- aerate mixtures, e.g. a creamed cake mix;
- add a range of flavours.

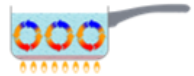
Aeration
Products such as creamed cakes need air incorporated into the mixture in order to give a well-risen texture. This is achieved by creaming a fat, such as butter or baking spread, with sugar.
Small bubbles of air are incorporated and form a stable foam.

Plasticity
Fats do not melt at fixed temperatures, but over a range. This property is called plasticity.

Raising agents
Raising agents include anything that causes rising within foods and are usually used in baked goods.
Raising agents can be:
- biological, e.g. yeast;
- chemical, e.g. baking powder;
- mechanical, e.g. adding air through beating or folding.

Key terms
Conduction: The exchange of heat by direct contact with foods on a surface.
Convection: Currents of hot air or hot liquid transfer the heat energy to the food.
Functional ingredients: Included in food for additional health benefits.
Heat transfer: Transference of heat energy between objects.
Radiation: Energy in the form of rays.

Tenderisation
- Mechanical tenderisation – a meat cleaver or meat hammer may be used to beat the meat. Cutting into small cubes or mincing can also help.
- Chemical tenderisation (marinating) –the addition of any liquid to flavour or soften meat before cooking.



Year 10 French Term 3: Ma vie scolaire (Module 3)

Le collège	*School*
1. ambition (f)	*ambition*
2. but (m)	*aim / goal / purpose*
3. classe (f)	*class / classroom*
4. collège (m)	*secondary school*
5. cours (m)	*lesson*
6. déjeuner (m)	*lunch*
7. devoirs (mpl)	*homework*
8. directeur (m)	*headteacher / boss*
9. école (f)	*school*
10. éducation (f)	*education*
11. élève (m)	*pupil / student*
12. études (fpl)	*studies*
13. examen (m)	*exam*
14. lycée (m)	*sixth form / college*
15. note (f)	*mark / grade*
16. pause (f)	*breaktime*
17. professeur / prof (m/f)	*teacher*
18. recherche (f)	*research*
19. rentrée (f)	*start of the school year*
20. travail (m)	*work*

L'uniforme & l'équipement	*Uniform & equipment*
21. cahier (m)	*exercise book*
22. chaussette (f)	*sock*
23. chaussure (f)	*shoe*
24. chemise (f)	*shirt*
25. cravate (f)	*tie*
26. jupe (f)	*skirt*
27. lettre (f)	*letter*
28. livre (m)	*(text)book*
29. ordinateur portable (m)	*laptop*
30. pantalon (m)	*trousers*
31. papier (m)	*paper*
32. porter	*to wear*
33. pull (m)	*jumper*
34. règle (f)	*rule / ruler*
35. sac (m)	*bag*
36. stylo (m)	*pen*
37. tableau (m)	*board / painting/ picture*
38. tablette (f)	*tablet*
39. texte (f)	*text*
40. veste (f)	*jacket*

Les matières	*Subjects*
41. anglais (m)	*English*
42. apprendre	*to learn*
43. art (m)	*art*
44. cours (m)	*lessons*
45. emploi du temps (m)	*timetable*
46. étudier	*to study*
47. faible	*weak*
48. fort	*strong*
49. français (m)	*French*
50. histoire (f)	*history / story*
51. langue (f)	*language*
52. leçon (f)	*lesson*
53. maths (mpl)	*Maths*
54. musique (f)	*music*
55. religion (f)	*religion*
56. sciences (fpl)	*Science*
57. sport (m)	*sport / PE*
58. technologie (f)	*technology / DT*
59. théâtre (m)	*theatre / drama*
60. utile	*useful*

Les règles	*Rules*
61. arriver	*to arrive*
62. autres	*others*
63. donner	*to give*
64. écouter	*to listen*
65. en retard	*late*
66. essentiel	*essential*
67. faire	*to do*
68. falloir	*to be necessary*
69. important	*important*
70. injuste	*unfair*
71. juste	*fair*
72. manger	*to eat*
73. nul	*rubbish*
74. pouvoir	*to be able to*
75. pratique	*practical*
76. problème (m)	*problem*
77. respecter	*to respect*
78. strict	*strict*
79. travailler	*to work*
80. utiliser	*to use*

étudier (to study)					
Past		***Present***		***Future***	
J'ai étudié	*I studied*	J'étudie	*I study*	Je vais étudier	*I am going to study*
Tu as étudié	*You studied*	Tu étudies	*You study*	Tu vas étudier	*You are going to study*
Il a étudié Elle a étudié	*He studied* *She studied*	Il étudie Elle étudie	*He studies* *She studies*	Il va étudier Elle va étudier	*He is going to study* *She is going to study*
Nous avons étudié	*We studied*	Nous étudions	*We study*	Nous allons étudier	*We are going to study*
Ils/elles ont étudié	*They studied*	Ils/elles étudient	*They study*	Ils/elles vont étudier	*They are going to study*

Year 10 French Term 4: En plein forme (Module 4)

La nourriture et les boissons	*Food and drink*
1. café (m)	*café / coffee*
2. chocolat (m)	*chocolate*
3. eau (f)	*water*
4. frites (fpl)	*chips*
5. fromage (m)	*cheese*
6. fruit (m)	*fruit*
7. gâteau (m)	*cake*
8. lait (m)	*milk*
9. légumes (mpl)	*vegetables*
10. œuf (m)	*egg*
11. pain (m)	*bread*
12. petit-déjeuner (m)	*breakfast*
13. poisson (m)	*fish*
14. repas (m)	*meal*
15. thé (m)	*tea*
16. viande (f)	*meat*
17. (avoir) faim	*(to be) hungry*
18. (avoir) soif	*(to be) thirsty*
19. boire	*to drink*
20. manger	*to eat*

La santé mentale	*Mental wellbeing*
21. adolescent (m)	*teenager*
22. aide (f)	*help*
23. crise (f)	*crisis*
24. difficulté (f)	*issue / problem / difficulty*
25. effect (m)	*effect*
26. émotion (f)	*emotion*
27. énergie (f)	*energy*
28. loisir (m)	*leisure (activity) / hobby*
29. malade/maladie (f)	*ill / illness*
30. médicament (m)	*medicine*
31. pharmacie (f)	*pharmacy / chemist*
32. heureux	*happy / lucky / fortunate*
33. mental	*mental*
34. responsible	*responsible*
35. améliorer	*to improve*
36. causer	*to cause*
37. dormir	*to sleep*
38. marcher	*to walk*
39. pleurer	*to cry*
40. se reposer	*to rest*

Ma santé physique	*Physical wellbeing*
41. accident (m)	*accident*
42. cœur (m)	*heart*
43. corps (m)	*body*
44. exercice (m)	*exercise*
45. forme (f)/en forme	*shape/in shape, healthy*
46. gorge (f)	*throat*
47. hôpital (m)	*hospital*
48. main (f)	*hand*
49. médecin (m/f)	*doctor*
50. pied (m)	*foot*
51. santé (f)	*health*
52. tête (f)	*head*
53. ventre (m)	*belly / stomach*
54. yeux (mpl)	*eyes*
55. (mal)sain	*(un)healthy*
56. physique	*physical*
57. végan	*vegan*
58. végétarien	*vegetarian*
59. avoir mal à la/au/aux	*to ache / hurt*
60. accident (m)	*accident*

Les sports	*Sports*
61. actif	*active*
62. améliorer	*to improve*
63. athlétisme (m)	*athletics*
64. bouger	*to move*
65. danse (f)	*dance*
66. exercice (m)	*exercise*
67. foot(ball) (m)	*football*
68. gymnase (f)	*gym*
69. handball (m)	*handball*
70. jouer (à)	*to play (a sport / game)*
71. marcher	*to walk*
72. natation (f)	*swimming*
73. participer (à)	*to take part (in)*
74. pratiquer	*to practise*
75. s'amuser	*to have fun*
76. s'entraîner	*to train*
77. sport (m)	*sport*
78. sportif	*sporty*
79. tennis (m)	*tennis*
80. vélo (m)	*bike / cycling*

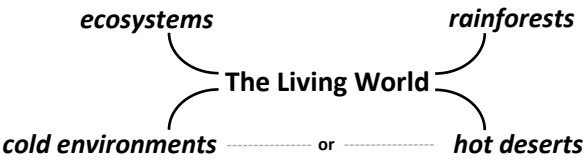
manger (to eat)					
Past		***Present***		***Future***	
J'ai mangé	*I ate*	Je mange	*I eat*	Je vais manger	*I am going to eat*
Tu as mangé	*You ate*	Tu manges	*You eat*	Tu vas manger	*You are going to eat*
Il a mangé Elle a mangé	*He ate* *She ate*	Il mange Elle mange	*He eats* *She eats*	Il va manger Elle va manger	*He is going to eat* *She is going to eat*
Nous avons mangé	*We ate*	Nous mangeons	*We eat*	Nous allons manger	*We are going to eat*
Ils/elles ont mangé	*They ate*	Ils/elles mangent	*They eat*	Ils/elles vont manger	*They are going to eat*

THE LIVING WORLD
Ecosystems

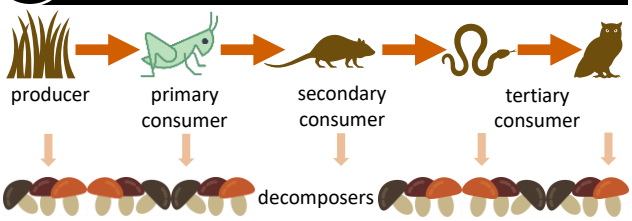
read

quiz

The Big Picture



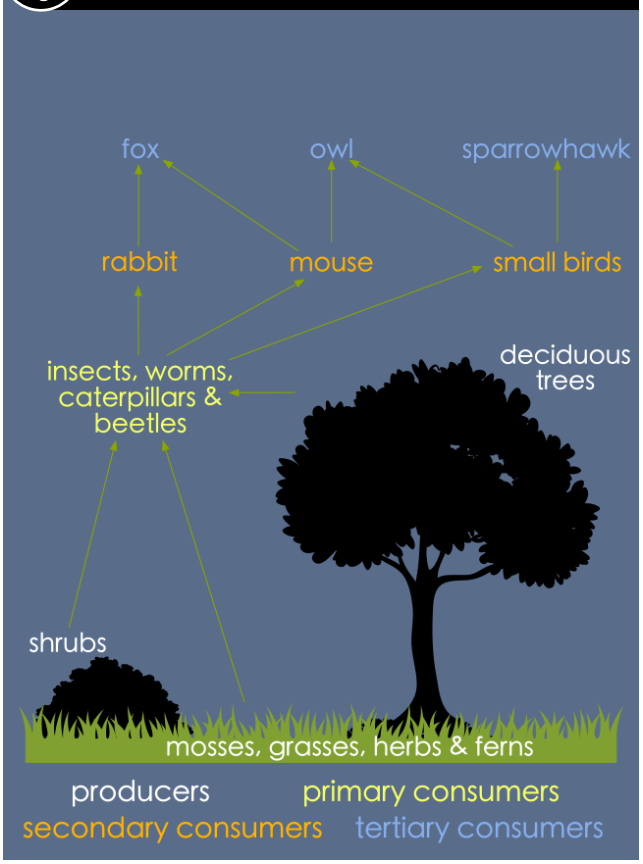
Food Chain



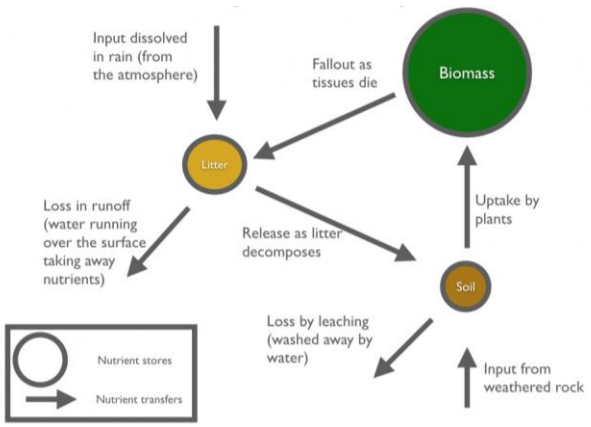
Key Terms

- ***Abiotic*** – The non-living elements of an ecosystem e.g. climate, soil and water.
- **Biotic** – Organisms found in an ecosystem e.g. plants, insects & animals.
- **Ecosystem** – a community of plants and animals sharing an environment with non-living things.
- **Producer** – A type of organism produce their own food usually by photosynthesis.
- **Consumer** – Organisms that consume other organisms to obtain their energy.
- **Decomposer** – Organisms that break down dead plants and animals.
- **Food chain** – The flow of energy from producer to tertiary consumer.
- **Food web** – A diagram showing lots of food chains and how they overlap.
- **Nutrient cycle** – The transfer of nutrients through an ecosystem.

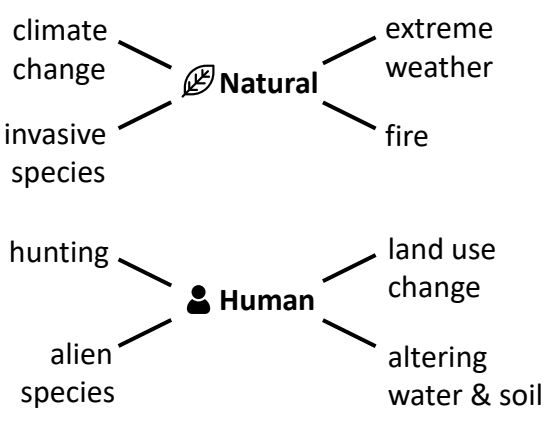
Food Web



The Nutrient Cycle



Ecosystem Change



THE LIVING WORLD
Rainforests

read

quiz

The Big Picture

Key Terms

Biome – Areas of the planet with a similar climate and landscape, where similar animals and plants live.

Biodiversity – The variety of life in the world or a particular habitat.

Commercial farming – Farming to sell produce for a profit.

Debt reduction – National debt relief in return for protecting rainforests.

Deforestation – The chopping down and removal of trees.

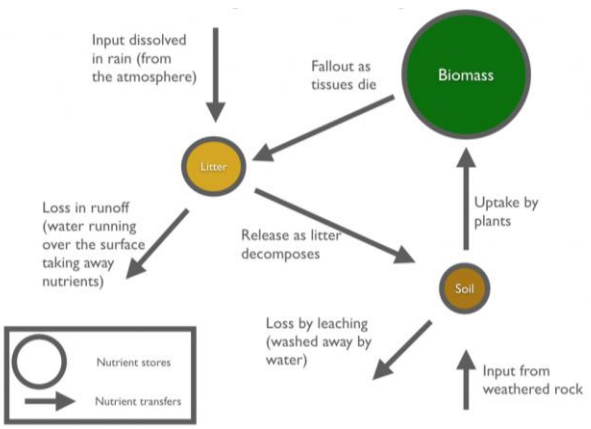
Ecotourism – Responsible travel to natural areas that conserves the environment and benefits locals.

Logging – Cutting down trees and selling the timber.

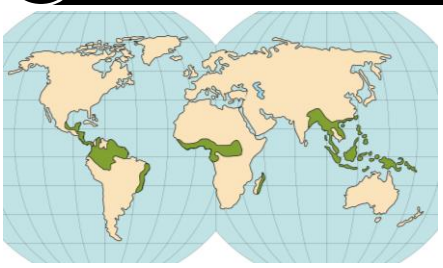
Soil erosion – Removal of topsoil faster than it can be replaced.

Sustainability – Progress meting todays needs with affecting future generations.

The Nutrient Cycle



Location



10°N and 10°S of the Equator

South America (Amazon), the DRC (Africa), Indonesia & Malaysia (Asia)

Characteristics

Climate - High temperatures (27°C) and high rainfall (2000mm +)

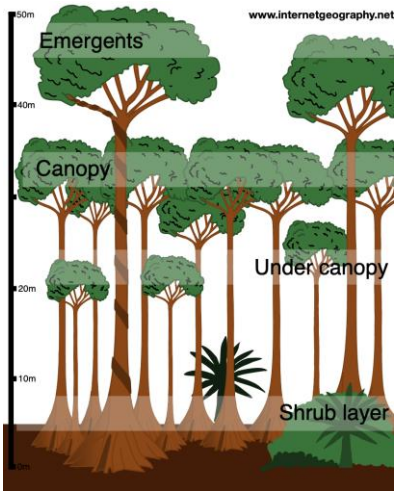
Water – Distinct wet season lasting several months. Leaching during this time.

Soil – Not very fertile. Nutrients concentrated in the topsoil & quickly absorbed.

Biotic – Highest biodiversity in the world. Thousands of species of plants and animals.

People – Traditional tribes live sustainably. Exploitation for $$ gain by non-indigenous.

Adaptations



Emergents and lianas grow to reach the sunlight.

Buttress roots anchor the trees in the shallow soil.

Smooth bark to deter epiphytes.

Plants have thick, waxy leaves & drip tips to channel water.

Poison Dart Frog - bright colours deter predators.

Sloths - long, sharp claws that help them cling onto branches.

Spider Monkey - prehensile tail to be able to grasp the branches of trees.

Jaguars - large claws, which enable them to climb small trees and catch their prey.

THE LIVING WORLD
Rainforests

read

quiz

The Big Picture

ecosystems — *rainforests** — The Living World — *cold environments* — or — *hot deserts*

Value

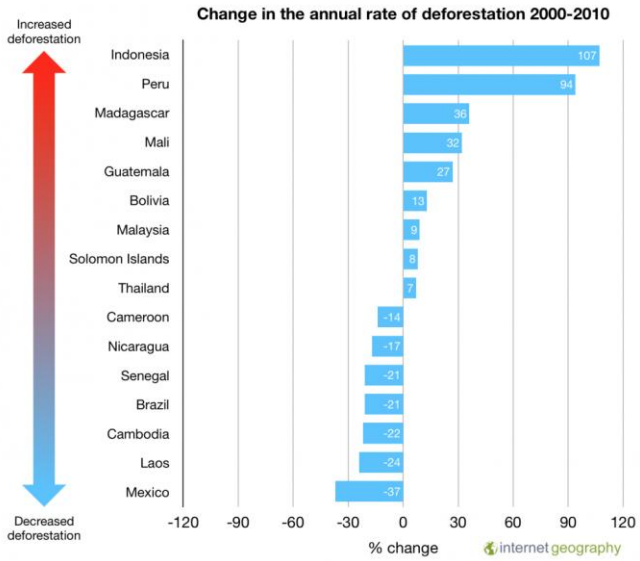
Services

- Carbon sink
- Water and nutrient cycling
- Protection against soil erosion
- Wildlife habitats
- Biodiversity
- Employment opportunities

Goods

- Native food crops (fruit and nuts)
- Wild meat and fish
- Building materials (timber)
- Energy from hydro electric power
- Water
- Medicines

Deforestation Rates



Causes of Deforestation

Logging – Hard wood (mahogany & teak) valued for furniture. Small trees pulped/charcoal.

Road building – Increased accessibility encourages development e.g. Trans-Amazonian.

Mineral extraction – Minerals (gold, bauxite, and copper) mined extensively.

Energy development – High rainfall creates ideal conditions for HEP.

Settlement and population growth – Settlements developed to service developments.

Impacts of Deforestation

Economic Development

- Commercial farming and mining generate employment and tax income
- Education, health care and social conditions are improved from tax revenue.
- Raw materials used by processing industries increasing the value of exported products.
- Cheap, renewable energy = development.
- Long-term economic losses due to forests being destroyed and rivers polluted.
- Loss of biodiversity affects tourism.

Soil Erosion

- Exposed land increases soil vulnerability to soil erosion reducing fertility.

Climate Change

- Local environment becomes hotter and drier.
- Reduction in carbon sink due to deforestation.
- Burning trees releases carbon dioxide.

Sustainable Management

International hardwood agreements — Ecotourism — debt reduction — Strategies — conservation and education — Selective logging and replanting

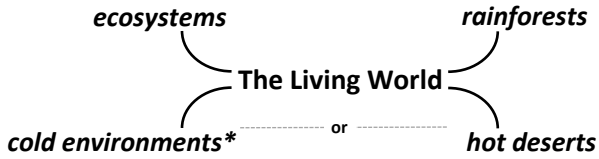
THE LIVING WORLD

Cold Environments

read

quiz

The Big Picture



Key Terms

Biodiversity – The variety of life in the world or a particular habitat.

Fragile environment – An environment that is both easily disturbed and difficult to restore if disturbed.

Infrastructure – Basic equipment and structures for a location to function.

Mineral extraction – The removal of solid mineral resources from the earth.

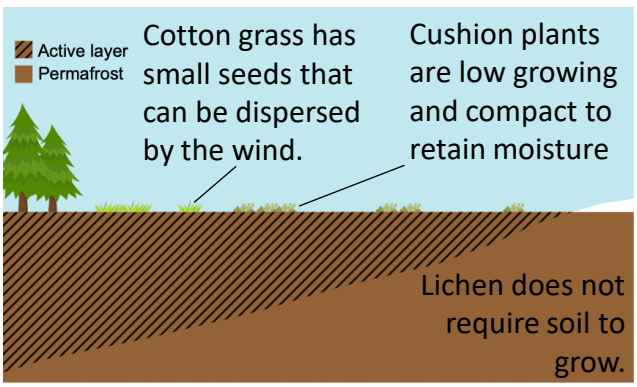
Permafrost – Permanently frozen ground.

Polar – Most extreme cold environment inc. Antarctica and much of Greenland.

Tundra – The flat, treeless Arctic regions where the ground is permanently frozen.

Wilderness area – A natural environment that has not been significantly modified by human activity.

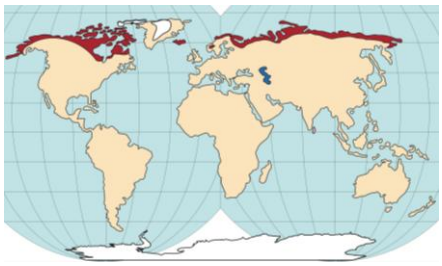
Adaptations



Arctic Foxes and Arctic Hares

- have thick fur on their bodies and feet to keep them warm
- in winter their fur becomes white providing camouflage from predators

Location



Polar – Antarctica and much of Greenland.

Tundra – Includes parts of Canada, Alaska, Northern Europe and Russia.

Characteristics

Climate – P = Temp below freezing all year and precipitation low. T = High temp range. Snowy winter, rain in summer. Dark winter.

Permafrost – T = active layer freezes in winter and thaws in summer. Permafrost below.

Soil – P = mainly bare rock. T = Thin and lack fertility. Waterlogged in summer. Depth and fertility increase from Poles.

Biotic – Low level of biodiversity. Food chain and webs are very basic. Adaptations required.

People – No permanent settlements in polar. Indigenous people live in tundra esp. near coast.

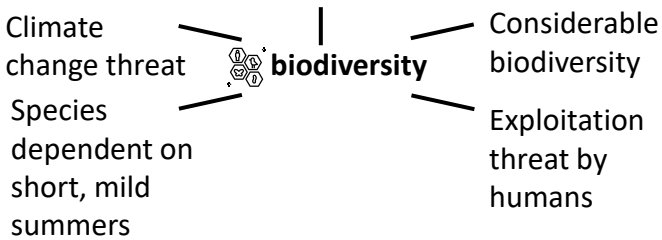
Interdependence

Interdependence includes:

- simple food webs
- sustainable coexistence of people, plants and animals in cold environments
- adaptations of plants and animals to soil and climate characteristics
- potential damage to the ecosystem inflicted by resource exploitation.

Biodiversity

Thousands of species of lichens, plants and insects.



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THE LIVING WORLD
Svalbard

quiz

The Big Picture

ecosystems — *rainforests*

The Living World

*cold environments** — or — *hot deserts*

Location

About

Svalbard is an archipelago (a large group of islands) located in northern Europe, halfway between Norway and the North Pole. It is one of the world's northernmost inhabited areas and is administered by Norway. It has a permanent population of 2700, of which 2300 live in Longyearbyen, the administrative centre of the islands.

Opportunities

Mineral resources – Svalbard has a significant amount of coal and coal mining is the main economic activity on the islands, once employing over 300 people.

Energy – A coal-fired power station meets Svalbard's energy needs. This and the need to fly frequently results in Svalbard residents having Europe's highest carbon footprint.

Tourism – Svalbard is a popular tourist destination and is visited regularly by cruise ships. Some 70,000 tourists visited in 2011, of which 30,000 arrived on cruise ships.

Fishing – The Barents Sea that surrounds Svalbard is home to some of the best fishing grounds in the world. Fishing is controlled, which means it is sustainable.

Challenges

Buildings and infrastructure – Permafrost is difficult to build on. Roads are constructed on gravel beds so the permafrost does not thaw. Raised, insulated utility pipes protect services.

Inaccessibility – Svalbard is a very remote region, relying on transport such as planes and ships for access. Locals rely on snowmobiles and 4x4s in the winter.

Temperature – Winter temperatures can drop below -30°C in Svalbard. This, along with limited sunlight in the winter, makes working outside very challenging. In the winter the sea freezes and roads become very dangerous.

Key Terms

Ecotourism – Travel that conserves the environment and benefits locals.

Inaccessibility – Very difficult to travel or impossible to travel to or reach.

Infrastructure – Basic equipment and structures for a location to function.

Non-renewable energy – Energy from sources that will run out e.g. oil.

Permafrost – Land that is permanently frozen.

Sparsely populated – Few people live in an area.

THE LIVING WORLD

read

Protecting Cold Environments

quiz

The Big Picture

ecosystems — ***rainforests***

The Living World

cold environments* — **or** — ***hot deserts***

What is a wilderness area?

Wilderness areas are remote, unspoilt parts of the world including deserts, mountains and cold environments. Wilderness areas are typically unspoilt by human development and remain natural. Many of the world's cold environments are considered wilderness areas due to their remoteness and physical conditions.

Protecting wilderness areas

Cold environments need to be protected for a range of reasons, including:

- Tundra and polar environments are fragile environments. Recovery from human impact can take significant time.
- Indigenous culture depends on the preservation of the natural environment.
- Cold environments are home to a range of species, many are unique.
- There is a global moral responsibility to protect wilderness areas.
- Scientists need to study global processes in unspoilt areas e.g. climate change.

Strategies to maintain cold environments

Stilts raise the insulated Trans-Alaskan oil pipeline above the ground to reduce the risk of thawing permafrost and disrupting animal migration.

Pumping stations enable the oil to flow over mountainous areas in the region.

Only allows the use of Antarctica for peaceful purposes, and military activities are forbidden.

Promotes co-operation among international scientists.

Strict controls on tourism and landing sites to reduce the impact of tourists.

Technology can provide environmentally friendly solutions to some of the challenges faced by developing cold environments.

Antarctica is often described as 'the last wilderness on Earth'. It has remained undeveloped since the 1959 Antarctic Treaty.

Technology — **International Agreements**

Maintaining Cold Environments

Action by Governments — **Conservation Groups**

Since oil was found in Alaska in the 1960s, the US government has been involved in protecting the environment.

Conservation groups (e.g. WWF), work with governments, communities and businesses to protect Arctic biodiversity.

Alaska's marine habitats and fishing have been monitored by the National Oceanographic and Atmospheric Administration (NOAA).

The Western Arctic Reserve has been set up in the north of Alaska, protecting the area from oil and gas extraction.

The WWF Arctic Programme was launched in 1992 to work with governments on issues such as climate change, polar bears, shipping and oil and gas including project such as:

- *Scientific research into endangered species*
- *Promoting sustainable development*
- *Monitoring and protecting ecosystems*

Year 10 German Term 3: Zurück zur Schule! (Module 1)

Die Schule	*School*
1. Ausbildung (f)	*training / education*
2. Bibliothek (f)	*library*
3. Bildung (f)	*education*
4. Club (m)	*club*
5. Hausaufgabe (f)	*homework*
6. Hochschule (f)	*college*
7. Klasse (f)	*class / year (in school)*
8. Lehrer (m)	*teacher*
9. Leistung (f)	*achievement / performance*
10. Mannschaft (f)	*team*
11. Mitagessen (bt)	*lunch*
12. Pause (f)	*break*
13. Prüfung (f)	*test / exam*
14. Regel (f)	*rule*
15. Reise (f)	*journey / trip*
16. Schule (f)	*school*
17. Schüler (m) / Schülerin (f)	*pupil / student (at school)*
18. sitzen bleiben	*to repeat a year in school*
19. Studium (nt)	*studies*
20. Universität (f)	*university*

Die Uniform & das Arbeitsgerät	*Uniform & equipment*
21. App (f)	*app*
22. Buch (nt)	*book*
23. Computer (m)	*computer*
24. Handy (nt)	*mobile phone*
25. Heft (nt)	*workbook / exercise book*
26. Hemd (nt)	*shirt*
27. Hose (f)	*trousers*
28. Jacke (f)	*jacket*
29. Kleidung (f)	*clothing*
30. Krawatte (f)	*tie*
31. Kuli (m)	*pen*
32. Laptop (m)	*laptop*
33. Pullover / Pulli (m)	*jumper*
34. Seite (f)	*side / page*
35. Smartphone (nt)	*smartphone*
36. Stuhl (m)	*chair*
37. Tasche (f)	*bag / pocket*
38. Tisch (m)	*table*
39. tragen	*to wear*
40. Uniform (f)	*uniform*

Fächer	*Subjects*
41. arbeiten	*to work*
42. bestehen	*to pass (an exam)*
43. Deutsch (nt)	*German*
44. Englisch (nt)	*English*
45. Fach (nt)	*subject*
46. Geschichte (f)	*history / story*
47. Hart	*hard*
48. Kunst (f)	*art*
49. lernen	*to learn*
50. Mathe(matik) (f)	*Maths*
51. Religion (f)	*Religion*
52. schwer	*heavy / difficult*
53. Schwierig	*hard / difficult*
54. Sport (m)	*sport / PE*
55. Sprache (f)	*language*
56. stark	*strong / strongly*
57. Stunde	*lesson / hour / class*
58. Themen (nt)	*themes / topics / subjects*
59. Unterricht (m)	*lesson / teaching / classes*
60. Wissenschaft (f)	*science*

Die Regeln	*Rules*
61. besuchen	*to visit / to attend (school)*
62. brauchen	*to need*
63. dürfen	*to be allowed to*
64. essen	*to eat*
65. falsch	*wrong*
66. Gang (m)	*corridor*
67. immer	*always*
68. Klassenzimmer (nt)	*classroom*
69. laufen	*to run*
70. leise	*quiet*
71. machen	*to do*
72. müssen	*to have to*
73. nie	*never*
74. nötig	*necessary*
75. Regel (f)	*rule*
76. richtig	*right*
77. ruhig	*quiet*
78. sollen	*to be expected to*
79. vergessen	*to forget*
80. wichtig	*important*

lernen (to learn)					
Past		***Present***		***Future***	
Ich habe…gelernt.	*I learnt*	**Ich lerne**	*I learn*	**Ich werde…lernen.**	*I will learn*
Du hast…gelernt.	*You learnt*	**Du lernst**	*You learn*	**Du wirst…lernen.**	*You will learn*
Er/sie hat…gelernt.	*He/she learnt*	**Er/sie lernt**	*He/she learns*	**Er/sie wird…lernen.**	*He/she will learn*
Wir haben…gelernt.	*We learnt*	**Wir lernen**	*We learn*	**Wir werden…lernen.**	*We will learn*
Sie haben…gelernt.	*They learnt*	**Sie lernen**	*They learn*	**Sie werden…lernen.**	*They will learn*

Year 10 German Term 4: Bleib gesund! (Module 4)

Sport	*Sport*
1. Club / Klub (m)	*club*
2. Fahrrad / Rad (nt)	*bicycle / bike*
3. Fußball (m)	*football*
4. Handball (m)	*handball*
5. Leichtathletik (f)	*athletics / track and field*
6. Radfahren (m)	*cycling*
7. Schwimmen (nt)	*swimming*
8. Spiel (nt)	*game / match*
9. Sport (m)	*sport*
10. Team (nt) / Mannschaft (f)	*team*
11. Tennis (m)	*tennis*
12. Trainer (m)	*coach*
13. schwach	*weak*
14. sportlich	*sporty / athletic*
15. stark	*strong*
16. laufen	*to run*
17. schwimmen	*to swim*
18. spielen	*to play*
19. üben	*to practise*
20. wandern	*to hike*

Essen und trinken	*Food and Drink*
21. Brot (nt)	*bread*
22. Ei (nt)	*egg*
23. Eis (nt)	*ice / ice-cream*
24. Essen (nt)	*food*
25. Fisch (m)	*fish*
26. Fleisch (nt)	*meat*
27. Frühstück (nt)	*breakfast*
28. Gemüse (nt)	*vegetables*
29. Hunger (m)	*hunger*
30. Kaffee (m)	*coffee*
31. Käse (m)	*cheese*
32. Kuchen (m)	*cake*
33. Obst (nt)	*fruit*
34. Schokolade (f)	*chocolate*
35. Veganer (m)	*vegan*
36. Vegetarier (m)	*vegetarian*
37. Wasser (nt)	*water*
38. Wurst (f) / Würste (pl)	*sausage / sausages*
39. Essen	*to eat*
40. trinken	*to drink*

Unfälle & Krankheiten	*Accidents & Illnesses*
41. Es geht mir …	*I am … / I feel …*
42. es tut weh	*It hurts*
43. Wie geht's?	*How are you?*
44. Fitnesszentrum (nt)	*gym*
45. Arm (m)	*arm*
46. Auge (nt)	*eye*
47. Bauch (m)	*stomach*
48. Bein (nt)	*leg*
49. Fieber (nt)	*fever / high temperature*
50. Fuß (m)	*foot*
51. Hals (m)	*neck / throat*
52. Nase (f)	*nose*
53. Ohr(en) (nt/pl)	*ear(s)*
54. Rücken (m)	*back*
55. Schmerz(en) (m/mpl)	*pain(s)*
56. Unfall (m)	*accident*
57. allergisch	*allergic*
58. krank	*ill*
59. brechen	*to break*
60. rauchen	*to smoke*

Pyschische Gesundheit	*Mental wellbeing*
61. Apotheke (f)	*pharmacy / chemist*
62. Arzt (m) / Ärztin (f)	*doctor*
63. Doktor (m)	*doctor*
64. Form (f) / in Form	*fit*
65. Gesicht (nt)	*face*
66. Gesundheit (f)	*health*
67. Hilfe (f)	*help*
68. Kopf (m)	*head*
69. Krankenhaus (nt)	*hospital*
70. Medizin (f)	*medicine*
71. Ruhe (f)	*silence / peace*
72. Schutz (m)	*protection*
73. aktiv	*active*
74. Gefährlich	*dangerous*
75. Gestresst	*stressed*
76. gesund / gesünder	*healthy / healthier*
77. ruhig	*calm / peaceful*
78. (sich) bewegen	*to move / to exercise*
79. helfen	*to help*
80. schlafen	*to sleep*

essen (to eat)					
Past		***Present***		***Future***	
Ich habe…gegessen.	*I ate*	Ich esse	*I eat*	Ich werde…essen.	*I will eat*
Du hast…gegessen.	*You ate*	Du isst	*You eat*	Du wirst…essen.	*You will eat*
Er/sie hat…gegessen.	*He/she ate*	Er/sie isst	*He/she eats*	Er/sie wird…essen.	*He/she will eat*
Wir haben…gegessen.	*We ate*	Wir essen	*We eat*	Wir werden…essen.	*We will eat*
Sie haben…gegessen.	*They ate*	Sie essen	*They eat*	Sie werden…essen.	*They will eat*

History

Knowledge Organiser Elizabeth Topic 1: Queen, Government and Religion 1558-69	
There was much religious change under the Tudors and Elizabeth had to find a way of dealing with these issues. Many people objected to Elizabeth's coronation in 1558, and she faced questions over her legitimacy, with many preferring Mary Queen of Scots, and whether a woman could rule effectively.	
Key events	
1	**1558** Elizabeth's becomes queen.
2	**1559** Treaty of Cateau-Cambresis – England had to return Calais to France. – financial loss, England looks weak.
3	**1559** Religious Settlement.
4	**1556** Pope issued an instruction that English Catholics should not attend Church of England services.
5	**1560** Elizabeth helped Scotland Protestant lords defeat Mary of Guise. Treaty of Edinburgh (Elizabeth tries to get Mary, Queen of Scots, to give up her claim as heir to the English throne).
6	**1563** Philip II banned import of English cloth into Netherlands.
7	**1567** Elizabeth allows Dutch Sea Beggars (they were fighting the Dutch) to shelter in English harbours.
8	**1568** Genoese Loan (a loan taken by Phillip II of Spain to fight his war against the Dutch – seized by Elizabeth).
9	**1568** Mary Queen of Scots fled from Scotland and arrives in England.
10	**1569** Revolt of the Northern Earls (uprising, either due to religion or power…. either way, they intended to remove Elizabeth from power). **A serious threat**.
Key Concepts	
1	**Society and Government** was very structured and hierarchical. The monarch had much power.
2	**Elizabeth's accession** caused controversy as her gender, legitimacy (right to rule) and religion were questioned.
3	**Religion** – Elizabeth imposed her Religious Settlement, but this upset many English and foreign Catholics and some wanted Mary Queen of Scots to replace Elizabeth.
4	**Financial problems** – When Elizabeth took the throne the Crown was £300,000 in debt.
5	**Foreign powers** opposed to Protestantism remained an issue for Elizabeth, especially Scotland, France and Spain.

History

Key Words		
1	Nobility	Belonging to the aristocracy.
2	Merchants	Traders.
3	Privy council	Advisors to Elizabeth.
4	Justices of the Peace	Large landowners who kept law and order.
5	Patronage	To provide someone with an important job or position.
6	Secretary of State	Elizabeth's most important Privy Counsellor.
7	Divine Right	Belief that the monarchs right to rule came from God.
8	Royal Prerogative	Elizabeth could insist that Parliament did not talk about certain issues.
9	Succession	The issue of who was going to succeed the throne after the existing monarch died.
10	Legitimate	Being born in wedlock when the existing king and queen were married.
11	Puritans	Radical Protestants.
12	Act of Supremacy	Made Elizabeth supreme governor of the Church of England.
13	Act of Uniformity	Established the appearance of churches and the form of services they held.
14	Royal Injunctions	A set of instructions to reinforce the acts of Supremacy and Uniformity.
15	Recusants	Catholics who were unwilling to attend church services laid down by the Elizabethan religious settlement.
16	Heretics	People who refused to follow the religion of the monarch.
17	Philip II	Catholic King of Spain.
18	Excommunicated	Expulsion from the Catholic Church.
19	Sea Beggars	Dutch rebels who fled to the water.
20	Genoese Loan	When Elizabeth took gold loaned to Philip II by the bankers of Genoa.

History

Knowledge Organiser Topic 2: Challenges to Elizabeth at Home and Abroad 1569-88		
Elizabeth faced many serious threats both within England and from aboard. Many still wanted Mary Queen of Scots on the throne. Philip II of Spain also wanted to remove Elizabeth from the throne. Spain and England were religious and political rivals. There was particular tension when Drake tried to challenge Spanish dominance in the New World.		
Key events		
1	**1492** Discovery of the New World	
2	**1567** Spanish travel to Netherlands to crush Protestant revolt.	
3	**1568** Mary Queen of Sots arrives in England	
4	**1569** Revolt of the Northern Earls	
5	**1570** Elizabeth excommunicated	
6	**1571** The Ridolfi Plot	
7	**1572** Elizabeth hired Drake as a privateer	
8	**1576** Spanish Fury and Pacification of Ghent	
9	**1577-80** Drake circumnavigated the globe.	
10	**1583** Throckmorton Plot	
11	**1584** Treaty of Joinville	
12	**1585** Act of Preservation of the Queen's Safety/Treaty of Nonsuch	
13	**1586** Babington Plot	
14	**1587** Mary Queen of Scots executed	
15	**1587** Attack on Cadiz	
16	**1588** Spanish Armada	
Key Ideas. Events and People explained.		
18	**New World**	North and South America.
19	**Revolt of the Northern Earls**	When northern earls encouraged Catholics to rebel and remove Elizabeth from power in favour of Mary, Queen of Scots.
20	**Mary Queen of Scots**	Elizabeths Catholic cousin, she was heir to the throne if Elizabeth had no children. Mary was involved in all main plots against Elizabeth.
21	**Thomas Howard, Duke of Norfolk**	One of England's most senior nobles and a Protestant, executed for his plotting against Elizabeth.
22	**Earl of Northumberland and Earl of Westmorland**	The leaders of the Northern Revolt.

History

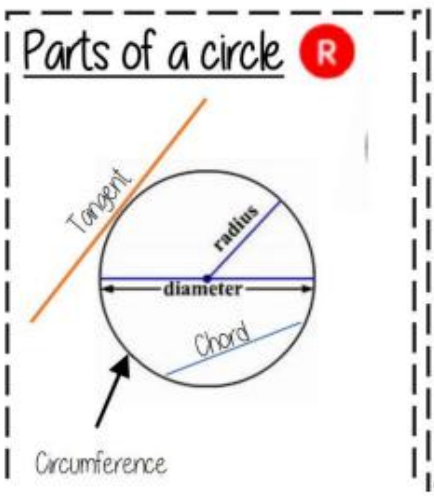
26	**Papal Bull**	A written order by the Pope.
28	**Ridolfi Plot**	Plan to murder Elizabeth, launch a Spanish attack and put Mary Queen of Scots on the throne.
29	**Throckmorton Plot**	Planned for the French Duke of Guise to invade England, free Mary, overthrow Elizabeth and restore Catholicism in England.
30	**Babington Plot**	The Duke of Guise (France) would invade England and put Mary on the throne.
31	**Sir Francis Walsingham**	Elizabeth's Secretary of State.
34	**Privateer**	Individuals with their own armed ships that capture other ships for their cargo, often with the support and authorisation of the government.
35	**Francis Drake**	Elizabeth hired him as a privateer to raid Spanish territory and ships. 2nd person to ever sail around the world.
37	**Spanish Fury**	The Spanish rampaged through Dutch provinces as they left.
38	**Pacification of Ghent**	Spanish troops expelled from Netherlands, political autonomy to be returned and end of religious persecution.
40	**Treaty of Joinville**	The King of France and the King of Spain became allies against Protestantism.
41	**Treaty of Nonsuch**	Effectively put England and Spain at war.
42	**Singeing of the King of Spain's beard**	Drake sailed into Cadiz harbour, Spain's most important Atlantic port, and over 3 days destroyed 30 ships.

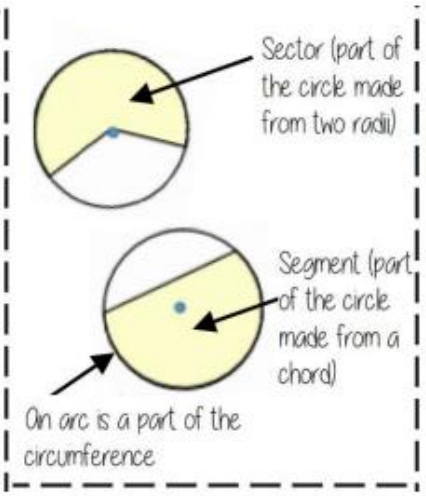
Key Concepts	
44	**Anglo-Spanish relations** are tense due to the situation in the Netherlands, the execution of Mary Queen of Scots and Philip's decision to send the Armada in 1588.
45	**Religion** continues to pose problems for Elizabeth as internal and external Catholics want her removed.
46	**The New World** brought untold riches to Spain and Elizabeth wanted some of this for England. Drake can be seen as a hero or a villain.

Maths: 10.06 Working with circles…

Key words	
Circumference	the length around the outside of the circle - the perimeter Area: the size of the 2D surface
Diameter	the distance from one side of a circle to another through the centre
Radius	the distance from the centre to the circumference of the circle
Tangent	a straight line that touches the circumference of a circle
Chord	a line segment connecting two points on the curve Frustrum: a pyramid or cone with the top cut off
Hemisphere	half a sphere
Surface area	the total area of the surface of a 3D shape

Sparx codes for this topic	
U767	Parts of a circle
M231, U950	Fractional parts of a circle
U221	Arc length
U373	Sector area
U617	Volume of a sphere
U116, U915	Volume of a cone and cylinder
U771	Surface are of a sphere
U771, U464	Surface are of cones and cylinders





Circumference $= \pi d$

Area of a circle $= \pi r^2$

Arc length $= \frac{\theta}{360} \times$ circumference

Sector area $= \frac{\theta}{360} \times$ area of circle

Volume Cylinder $= \pi r^2 h$

Volume Cone $= \frac{1}{3} \pi r^2 h$

Maths: 10.07 Vectors…

Key words	
Direction	the line our course something is going Magnitude: the magnitude of a vector is its length
Scalar	a single number used to represent the multiplier when working with vectors
Column vector	a matrix of one column describing the movement from a point
Resultant	the vector that is the sum of two or more other vectors
Parallel	straight lines that never meet

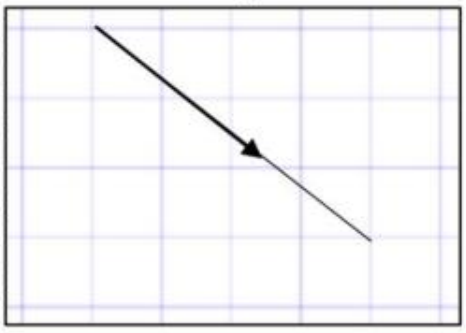
Sparx codes for this topic	
U632	Understand and represent vectors
U564, U660	Vectors multiplied by scalar
U903	Addition and subtraction of vectors
U781, U560	Extension

Understand and represent vectors

Column vectors have been seen in translations to describe the movement of one image onto another

Movement along the x-axis → $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$

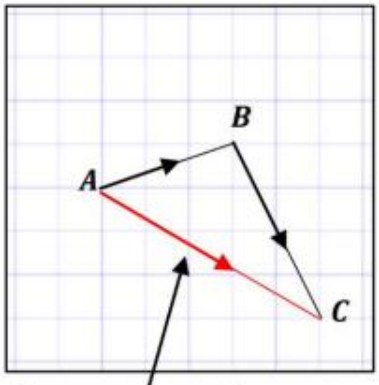
Movement along the y-axis



Vectors show both direction and magnitude

Addition of vectors

$\overrightarrow{AB} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$ $\overrightarrow{BC} = \begin{pmatrix} 2 \\ -4 \end{pmatrix}$



The resultant

$$\overrightarrow{AB} + \overrightarrow{BC}$$
$$= \begin{pmatrix} 3 \\ 1 \end{pmatrix} + \begin{pmatrix} 2 \\ -4 \end{pmatrix}$$
$$= \begin{pmatrix} 3+2 \\ 1+-4 \end{pmatrix}$$
$$\overrightarrow{AC} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}$$

Look how this addition compares to the vector $\overrightarrow{AC}$

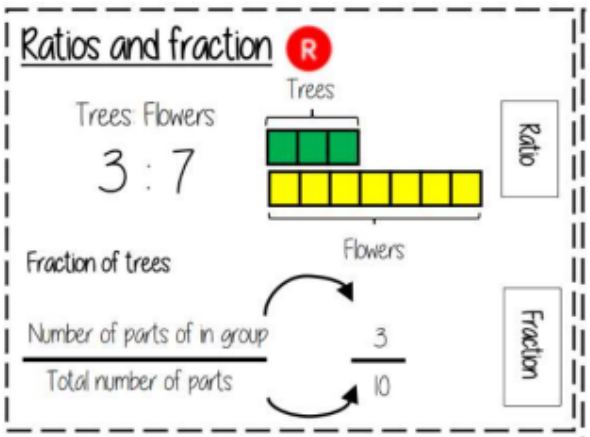
$$\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AC} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}$$

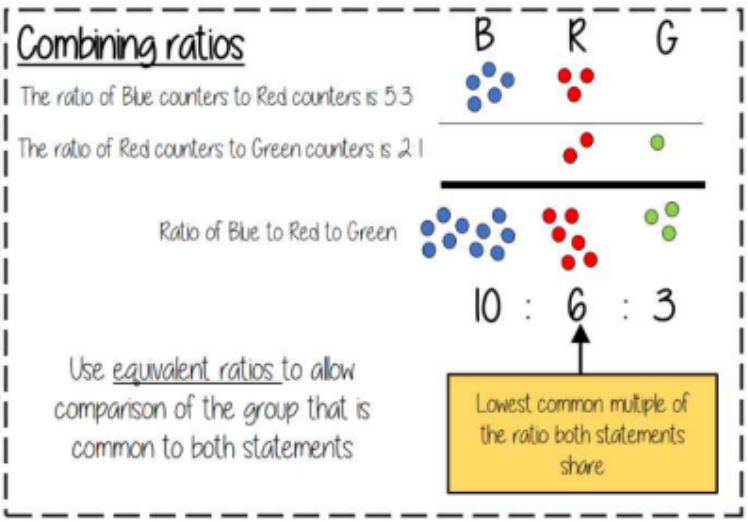
The arrow points in the direction of the vector, from the start to the finish. The direction is important to correctly write the vector.

Maths: 10.08 Ratio and fractions…

Key words	
Ratio	a statement of how two numbers compare Equivalent: of equal value
Proportion	a statement that links two ratios
Integer	whole number, can be positive, negative or zero
Fraction	represents how many parts of a whole
Denominator	the number below the line on a fraction. The number represent the total number of parts
Numerator	the number above the line on a fraction. The top number. Represents how many parts are taken
Origin	(0,0) on a graph. The point the two axes cross
Gradient	The steepness of a line

Sparx codes for this topic	
M525	Sharing a whole into a given ratio
M267	Ratios and fractions
M885	Compare with a ratio
U610	Conversion between currencies
M543	Ratios in 1:n
M112	Ratios and scale
M681	Best buys



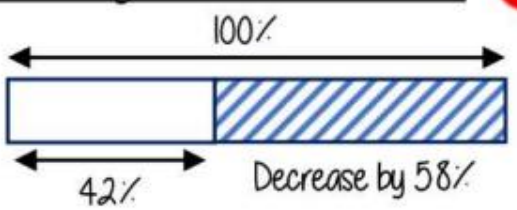


Maths: 10.09 Percentages & interest…

Key words	
Exponent	how many times we use a number in multiplication. It is written as a power
Compound interest	calculating interest on both the amount plus previous interest
Depreciation	a decrease in the value of something over time
Growth	where a value increases in proportion to its current value such as doubling
Decay	the process of reducing an amount by a consistent percentage rate over time
Multiplier	the number you are multiplying by
Equivalent	of equal value

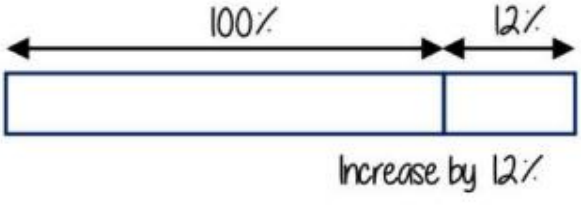
Sparx codes for this topic	
M264	M264 Compare FDP
M437, M905	Fraction/percentage of an amount
M235	Express as a percentage
M476, M533	Percentage increase/decrease
U332	Simple compound interest
U988	Growth and decay
M528	Find the original amount

Percentage increase/decrease



100% - 58% = 42%

100 – 058 = 042 ← Multiplier: Less than 1



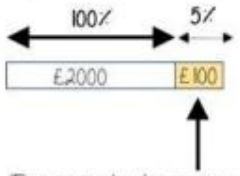
100% + 12% = 112%

100 + 0.12 = 1.12 ← Multiplier: More than 1

Simple and compound interest

Simple Interest

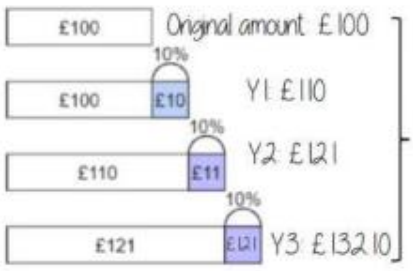
James invests £2000 at 5% simple interest



The original value increases by this amount every year

Compound Interest

Tess invests £100 at 10% compound interest for 3 years



Maths: 10.10 Probability…

Key words	
Event	one or more outcomes from an experiment
Outcome	the result of an experiment
Intersection	elements (parts) that are common to both sets
Union	the combination of elements in two sets
Expected Value	the value/ outcome that a prediction would suggest you will get
Universal Set	the set that has all the elements
Systematic	ordering values or outcomes with a strategy and sequence
Product	the answer when two or more values are multiplied together

Sparx codes for this topic	
M941, M755, M938	Probability
M332, M206	Experimental data
	Sample Space
M835	Fractions
M899, M419	Tables, Venn diagrams, Frequency trees
M299	Independent events
M572	Dependent events

Independent events

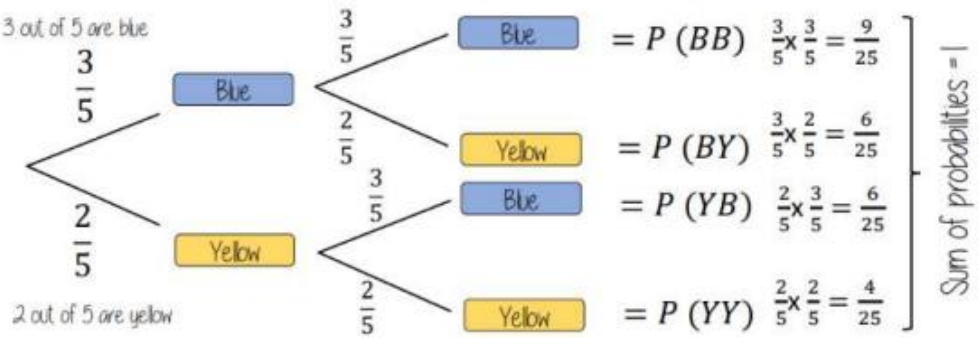
The outcome of two events happening. The outcome of the first event has no bearing on the outcome of the other

$$P(A \text{ and } B) = P(A) \times P(B)$$

Tree diagram for independent event

Isobel has a bag with 3 blue counters and 2 yellow. She picks a counter and replaces it before the second pick.

Because they are replaced the second pick has the same probability



R

Probability is always a value between 0 and 1

The probability of getting a blue ball is $\frac{1}{5}$

∴The probability of NOT getting a blue ball is $\frac{4}{5}$

The sum of the probabilities is 1

Sum to 1

Maths: 10.11 Data…

Key words	
Population	the whole group that is being studied
Sample	a selection taken from the population that will let you find out information about the larger group
Representative	a sample group that accurately represents the population
Random sample	a group completely chosen by change. No predictability to who it will include
Bias	a built-in error that makes all values wrong by a certain amount
Primary data	data collected from an original source for a purpose
Secondary data	data taken from an external location. Not collected directly
Outlier	a value that stands apart from the data set

Sparx codes for this topic

U840	Frequency tables & polygons
U363, U557	Bar & line charts
U508, U172	Draw & interpret pie charts
U981	Two-way tables
U291, U456, U260, U526, U7171	Averages from a list
U569, U877	Averages from a table
U200, U909	Stem & leaf
U199, U277, U128	Scatter graphs

Draw and interpret Pie Charts (R)

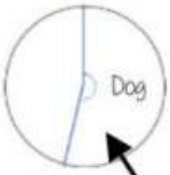
Type of pet	Dog	Cat	Hamster
Frequency	32	25	3

There were 60 people asked in this survey (Total frequency)

$\frac{32}{60}$ "32 out of 60 people had a dog"

This fraction of the 360 degrees represents dogs

$\frac{32}{60} \times 360 = 192°$



Use a protractor to draw This is 192°

Multiple method
Os 60 goes into 360 – 6 times
Each frequency can be multiplied by 6 to find the degrees (proportion of 360)

Comparing Pie Charts
You NEED the overall frequency to make any comparisons

Averages from lists R

The Mean

A measure of average to find the central tendency... a typical value that represents the data

24, 8, 4, 11, 8,

Find the sum of the data (add the values)

55

Divide the overall total by how many pieces of data you have

55 ÷ 5 | Mean = 11

The Mode (The modal value)

This is the number OR the item that occurs the most (it does not have to be numerical)

24, 8, 4, 11, 8,

This can still be easier if it the data is ordered first

Mode = 8

The Median

The value in the center (in the middle) of the data

24, 8, 4, 11, 8,

Put the data in order 4, 8, 8, 11, 24

Find the value in the middle 4, 8, 8, 11, 24

Median = 8

NOTE: If there is no single middle value find the mean of the two numbers left

For Grouped Data

The modal group – which group has the highest frequency

Averages from a table R

Non-grouped data

Number of Siblings	0	1	2
Frequency	6	8	6
Subtotal	0	8	12

Overall Frequency: 20

Total number of siblings: 20

The data in a list: 0,0,0,0,0,0,1,1,1,1,1,1,1,1,2,2,2,2,2,2

Mean: $\frac{\text{total number of siblings}}{\text{Total frequency}} = 1$

Averages from a table R

Grouped data

x Weight(g)	Frequency
$40 < x \leq 50$	1
$50 < x \leq 60$	3
$60 < x \leq 70$	5

Mid Point	MP x Freq
45	45
65	195
65	325

Overall Frequency: 9

Overall Total: 565

Mean: 62.8g

The data in a list: 45, 55, 55, 55, 65, 65, 65, 65, 65

Two way tables R

60 people visited the zoo one Saturday morning. 26 of them were adults. 13 of the adult's favourite animal was an elephant. 24 of the children's favourite animal was an elephant.

Extract information to input to the two-way table

Subgroups each have their own heading

	Adult	Child	Total
Elephant	13	24	37
Other	13	10	23
Total	26	34	60

Needs subgroup totals

Overall total

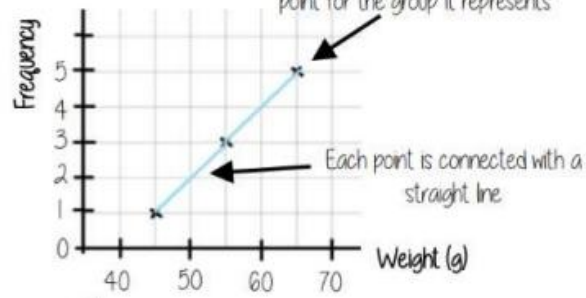
Frequency tables and polygons

x Weight(g)	Frequency
$40 < x \leq 50$	1
$50 < x \leq 60$	3
$60 < x \leq 70$	5

We do not know from grouped data where each value is placed so have to use an estimate for calculations

MID POINTS

Mid-points are used as estimated values for grouped data. The middle of each group



Mid-point

$\frac{\text{Start point + End point}}{2}$

Stem and leaf

A way to represent data and use to find averages

This stem and leaf diagram shows the age of people in a line at the supermarket

0	7 9
1	4 5 6 8 8
2	1 3
3	0

Key: 1|4 Means 14 years old

Stem and leaf diagrams:
Must include a key to explain what it represents
The information in the diagram should be ordered

Back to back stem and leaf diagrams

Girls		Boys
5	14	
7, 5, 5, 5, 4	15	3, 8, 9
8, 4, 2, 1, 0	16	2, 5, 7, 7, 7, 8, 8, 9
9, 8, 7, 6, 6, 4, 2, 1, 1, 0, 0	17	0, 2, 3, 6, 6, 7, 7
	18	0, 1, 4, 5

15 | 3,
Means 153 cm tall

Back to back stem and leaf diagrams:
Allow comparisons of similar groups
Allow representations of two sets of data

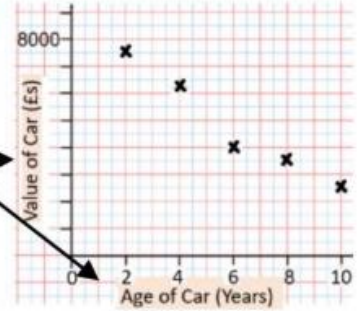
Draw and interpret a scatter graph

R

Age of Car (Years)	2	4	6	8	10
Value of Car (£s)	7500	6250	4000	3500	2500

- This data may not be given in size order
- The data forms information pairs for the scatter graph
- Not all data has a relationship

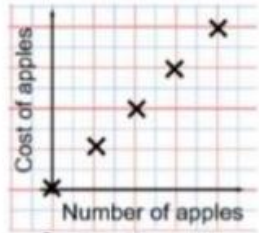
All axes should be labelled



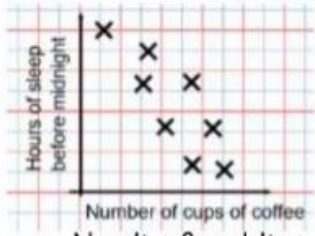
The axis should fit all the values on and be equally spread out

"This scatter graph show as the age of a car increases the value decreases"

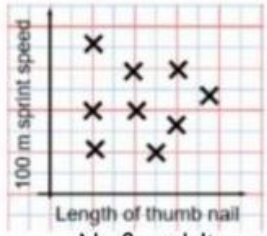
The link between the data can be explained verbally



Positive Correlation



Negative Correlation



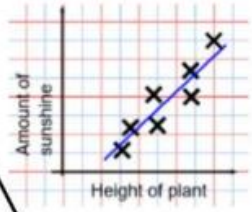
No Correlation

The line of best fit

R

The Line of best fit is used to make estimates about the information in your scatter graph

Things to know:
- The line of best fit DOES NOT need to go through the origin (The point the axes cross)
- There should be approximately the same number of points above and below the line (It may not go through any points)
- The line extends across the whole graph



It is only an estimate because the line is designed to be an average representation of the data

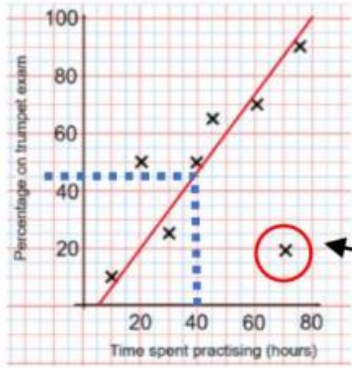
It is always a straight line.

Using a line of best fit

R

Interpolation is using the line of best fit to estimate values inside our data point

e.g. 40 hours revising predicts a percentage of 45



Extrapolation is where we use our line of best fit to predict information outside of our data
This is not always useful – in this example you cannot score more that 100% so revising for longer can not be estimated

This point is an "**outlier**"
It is an outlier because it doesn't fit this model and stands apart from the data

Personal Development

Exploring Influence

1. Understanding Influence

Influence = the power something or someone has to shape our thoughts, feelings, or behaviour. Influences can be positive, negative, or neutral, and may come from:

- Friends and peers
- Family
- Social media
- Celebrities and influencers
- Community and culture
- School and teachers
- Media and advertising
- Gangs or criminal groups
- Drugs/alcohol

2. The Influence & Impact of Drugs

Types of drugs

- Legal drugs: alcohol, nicotine, vapes, some prescription drugs
- Illegal drugs: cannabis, cocaine, MDMA/ecstasy, ketamine, heroin, nitrous oxide

Why young people might use drugs

- Curiosity
- Peer pressure
- Stress, anxiety or self-medication
- Misunderstanding risks
- Coping with difficult life events
- Influence from music, TV, films or social media

Risks & Impact

- Short-term health effects: nausea, overheating, poisoning, panic, accidents
- Long-term impacts: addiction, mental health struggles, memory problems, school absence
- Legal consequences: arrest, criminal record, exclusion
- Social effects: damaged relationships, financial problems

Coercion & Exploitation

- Some gangs groom young people by supplying "free" drugs
- Debt is created, leading to pressure to repay through risky behaviour
- This can lead to **child criminal exploitation (CCE)** or **county lines**

3. Gangs

Why young people may be drawn into gangs

- Feeling isolated or wanting to belong
- Desire for protection, identity, or status
- Financial pressures
- Local area influences
- Grooming and manipulation from older individuals
- Lack of positive support at home or school

Signs of grooming or gang involvement

- Sudden new possessions with no explanation
- Going missing / secretive behaviour
- New older "friends"
- Being tired or anxious
- Carrying weapons or drugs
- Increased conflict at home or school

Risks & consequences

- Violence or exploitation
- Criminal record
- Carrying weapons increases risk of harm
- Loss of education and opportunities
- Trauma and long-term mental health issues
- Pressure, fear, and loss of independence

Personal Development

Staying safe

- Recognise early signs of grooming
- Avoid risky areas or situations
- Build strong connections with trusted adults
- Report worries to safeguarding staff
- Understand your rights around coercion and threats

4. Media Influence

What counts as media?

- TV and films
- Social media
- News
- Advertising
- Gaming
- Streaming platforms

Techniques the media use to influence

- Emotional targeting (making you feel fear, excitement, envy etc.)
- Repetition
- Attractive imagery or music
- Influencers and sponsorship
- Algorithms
- Filters, editing and AI-generated images

Impact on behaviour and emotions

- Unrealistic expectations around body image
- Pressure to conform or buy products
- Anxiety or FOMO
- Normalising risky behaviours
- Misleading information
- Comparison with others
- Lower self-esteem

Staying media smart

- Question what you see: *Who made it? Why? What do they want?*
- Check information using reliable sources
- Unfollow unhealthy accounts
- Be aware of editing
- Manage screen time
- Think about consent and privacy when posting

5. Managing Peer Pressure & Making Independent Choices

Types of peer pressure

- Direct: being asked or dared
- Indirect: wanting to fit in without being asked
- Digital: group chats, social media trends, online dares
- Coercive: threats, guilt, manipulation

Strategies to resist pressure

- Say no confidently and clearly
- Suggest safer alternatives
- Have a "get out" phrase with parents/carers
- Stay with friends who respect your choices
- Walk away if you feel unsafe
- Talk to a trusted adult early

6. Support & Reporting

- Safeguarding team (blue lanyards)
- Class teachers / tutors
- Counsellors / mentors
- Childline: 0800 1111
- CEOP: report online exploitation
- Crimestoppers: anonymous crime reporting
- NHS (mental health, substance use, physical health)
- Youth services, local charities, community groups

Personal Development

Healthy Relationships, Sex Expectations and Media Influence

1. Healthy Relationships

Features of a Healthy Relationship	Signs of Unhealthy or Abusive Relationships
Respect – Valuing each other's opinions, boundaries and individuality. **Equality** – Shared decision-making, power balance, fairness. **Trust & Honesty** – Feeling safe to share your thoughts and feelings. **Communication** – Open, truthful discussions about needs, boundaries and concerns. **Consent** – Clear, enthusiastic agreement. Consent must be *freely given, reversible, informed, enthusiastic and specific.* **Safety** – Feeling emotionally and physically safe; no pressure or manipulation.	Controlling behaviour Jealousy or monitoring Pressure to do sexual things Put-downs, insults, threats Physical intimidation or violence Feeling scared, guilty or trapped

2. Understanding Sex Expectations

What Shapes Expectations?	What Sex *Should* Be
Personal values Cultural influences Peer pressure Media, films and TV Pornography Previous experiences or relationships	Mutually agreed Respectful and safe Based on consent Free from pressure A positive experience for all partners

Common Myth vs. Reality

Myth	Reality
"Everyone is doing it by your age." "Sex always goes perfectly." "You must say yes to keep someone happy."	Most people your age are *not* sexually active. Real experiences vary; communication is key. Consent must be voluntary. A healthy partner respects no.

Personal Development

3. Pleasure, Challenges and Emotions

Pleasure

- Can be physical, emotional or both
- Requires trust, communication and comfort
- Everyone experiences pleasure differently
- It is okay not to want sexual activity – ever or at certain times.

Possible Challenges	Managing Challenges
Anxiety or self-consciousness Body image worries Miscommunication Fear of judgement Emotional consequences Pressure from a partner or peers	Talk openly with your partner Set boundaries Take things slowly Seek support from trusted adults Prioritise safety and wellbeing

4. Consent and Boundaries

Consent Includes…	What is NOT Consent…
Clear 'yes' Ongoing – can stop at any time Checking in with your partner Respecting verbal and non-verbal cues	Silence Pressure, guilt or manipulation Being under the influence so that someone can't think clearly Assumptions based on relationship status
Setting Boundaries…	
"I'm not comfortable with that." "Can we slow down?" "I don't want to do this today." "Please don't talk to me like that."	

5. Impact of the Media

How Media Shapes Views of Relationships

- Promotes unrealistic body standards
- Shows exaggerated romance or drama
- Rarely models healthy communication
- Stereotypes about masculinity/femininity
- Normalises unhealthy behaviours (jealousy, power imbalance, controlling behaviour etc.)

Critical Thinking: Ask Yourself…

- Is this realistic?
- Who benefits from this portrayal?
- Does this show respect, equality and consent?

Personal Development

6. Pornography: Understanding it's Impact

What Porn *Is* and *Isn't*

- Pornography is staged, edited entertainment, not education.
- It often shows unrealistic bodies, expectations and behaviours.
- It rarely includes consent, communication or protection.

Possible Impacts on Young People

- Unrealistic expectations of sex
- Pressure to copy what is shown
- Distorted ideas about body image
- Confusion about consent
- Misunderstanding what healthy sex looks like

Safer, Realistic Information Sources

- RSE lessons
- NHS and health websites
- Sexual health services
- Trusted adults or professionals

7. Building Your Own Healthy Relationship Skills

- Communicating clearly
- Listening actively
- Knowing and expressing boundaries
- Developing self-esteem and self-respect
- Practising empathy
- Thinking critically about media messages

8. Where to Get Support

- Trusted adults (teacher, parent/carer, mentor)
- School pastoral team
- GP or local sexual health services
- Brook (sexual health info for young people)
- Childline (0800 1111)
- CEOP – report online abuse

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- Youth services, local charities, community groups

Photography

Physical Education

1.2.c. Preventing Injury in Physical Activity and Training		
1	**Cool Down**	Low intensity exercise and stretching after strenuous exercise to slowly decrease, breathing rate and heart rate and muscle temperature to resting levels
2	**Hazards**	something which presents a risk that could cause and injury
3	**Personal Protective Equipment (PPE)**	All equipment/clothing which is intended to be worn/held to reduce the chance of injury
4	**Risk**	The chance that someone will be harmed by a hazard
5	**Risk Assessment**	When you measure the risk of something happening, anticipate what the consequences could be and plan actions to prevent it
6	**Warm Up**	Physical activity to prepare the body physically and mentally for exercise to prevent injury

1.1.d. Respiratory System Key Terms		
1	**Aerobic capacity**	The maximum amount of oxygen your body can take in and use, measured with the V02 max test
2	**Aerobic Exercise/ Activity**	When oxygen is used for the duration of exercise to make energy, usually at moderate intensity at a continuous rate.
3	**Alveoli**	Small air sacks in the lungs which are the site of gas exchange.
4	**Anaerobic Exercise/ Activity**	'Without oxygen'. High intensity exercise for short periods of time where oxygen is not predominantly used to produce energy
5	**Breathing rate**	Number of breaths taken per minute
6	**Gas exchange**	The movement of O2 and CO2 between the alveoli and capillaries and the working muscles and capillaries.
7	**Minute ventilation**	(minute volume) Then volume of gas inhaled OR exhaled from the lungs in 1 minute
8	**Mitochondria**	the place in each muscle cell where energy is produced
9	**Respiratory Muscles**	Muscles which help air move in and out of the lungs (diaphragm and intercostals)
10	**Respiration system**	gets oxygen into the body and removes carbon dioxide. It's made up of the mouth/nose - bronchi- bronchioles and alveoli
11	**Tidal volume**	The amount of air breathed in or out in one breath. Measured in ml
12	**Trachea (windpipe)**	The pipe which connects the nose/mouth to the bronchi

1.2.a. Components of Fitness Key Terms

Agility the ability to change the direction of the body at speed, whilst maintaining control

Balance the ability to stay upright or stay in control of the body movement

Cardiovascular Endurance (Stamina) The ability to continue exercising whilst getting energy for muscular movement from the aerobic energy system

Coordination The ability to use two or more body parts together to complete a skill under control, smoothly and efficiently

Fitness The ability to meet the demands of your environment. It can be tested and improved.

Flexibility The range of movement at a joint

Muscular endurance the ability to repeatedly use your muscle and body without tiring

Power A type of fitness. The ability to exert maximal force in as shortest time possible

Reaction Time The ability to respond quickly to a stimulus

Speed The ability move part or the whole body quickly

Strength The maximum force a muscle or group of muscles can exert against a resistance

Religion & Philosophy GCSE 10. 2 Christian Practices—CORE

Topic 1: Worship & Prayer	
Worship	Celebration of love and thankfulness to God
Liturgical	Worship follows a set structure (Traditional)
Informal	Worship is free & improvised
Individual	Private worship
Prayer: with	Communicating with God
Set Prayers	Prayers that follow a set structure
Informal Prayer	Free and improvised prayer. More personal and less restrictive
Quaker Worship	Silent Meetings - Calming No Leader, anyone can minister
Evangelical Worship	Modern music, Intense Emotions Pastor Led, Attractive

Topic 2: Sacraments and Pilgrimage	
Sacrament	Outward sign of an inward blessing
Baptism	Ceremony of admission to the Church
Original Sin:	Stain of sin inherited by all from Adam and
Eucharist	Sacrament commemorating the Last Supper, With consecrated bread & wine.
Transubstantiation	The bread and wine literally become the body and blood of Christ (Catholic)
Pilgrimage	Journey to place of religious interest
Taize	Ecumenical. For the healing of divisions in the church. Young People.
Lourdes	(Catholic) A place of miraculous healing

Topic 3: Festivals	
Christmas Celebrated by	Midnight Mass, Nativity Plays, Religious Cards, Carols, Presents
Advent	Four Sundays leading to Christmas. Advent Candles—Hope, peace, Joy & love
Holy Week	Remembers the week before the Resurrection
Palm Sunday	Wave Palm crosses to remember Jesus as King
Maundy Thursday	Priest washes congregations feet. Share the Eucharist
Good Friday	Solemn day of reflection & confession
Easter Sunday	Celebration Songs. Sunrise service

Topic 5: The Church—Uk & Global	
Secular	Not defined by religious values e.g Modern UK law, culture and '*religious*' festivals
UK Census 2001	Christianity 72 % Non-Religious 15%
UK Census 2011	Christianity 59 % Non-Religious 26%
UK Census 2021	Christianity 46 % Non-Religious 37%
House of Lords	26 bishops influence UK law making
Evangelism	Telling others about Christianity with intention of converting.
Tearfund	Christian charity, aid relief and education
Persecution	Hostile and ill-treatment based on religion
Reconciliation	Restoring of friendly relations
World Wide Council	Ecumenical group working for peace & reconciliation

Religion and Philosophy

Religion & Philosophy GCSE 10. 2 Christian Practices –EXTENSION KNOWLEDGE

Topic 1: Worship & Prayer	
Charismatic	Emphasises the presence of the Holy Spirit in worship. *Signs* and *Wonders*
Tongues	Speaking in a heavenly language
'Baptism' of the spirit	Holy Spirit comes upon a person powerfully
'ACTS'	Adoration, Confession, Supplication, Confession
LORDS Prayer	Set Prayer taught by Jesus, Guides C on how to pray and is a trusted tradition

Topic 2: Sacraments and Pilgrimage	
Infant Baptism	Catholic & CoE - (child) water sprinkled on their head three ties (trinity). Light Candles, Oil of Chism, Holy Water, Font, Godparents.
Believers Baptism	Protestant/Evangelical - Full immersion, Testimony, Invite friends, symbolising death and resurrection
Eucharist	Trad: Consumed at Alter, Shared Cup, Modern: Consumed in seat, own cups
Memorialism	The bread and wine are symbolic acts of re-membrance and commitment (Protestant)
Consecrated	Set apart through priestly blessing
Ecumenical	Christians working together across denominations

Topic 3: Festivals	
Lent	Fast for 40 days to prove faith and test self-discipline. Remembers Jesus in the wilderness

Topic 4: The Church—Uk & Global	
Sources of Authority	Bible - Ultimate guide on Christian belief Tradition - Trusted ways of being through history Church Leaders - Responsible and trusted guides
Good Works	Serving the community
Fellowship	Mutually supportive community of believers
Diversity	'***Differences'*** UK has many different faiths
Cultural Furniture	Influenced by Christianity 'behind the scenes'
Global Census	Christianity 32% Islam 24% Non-Rel: 16%
2050 Prediction	Christianity & Islam grow total share, in part due to birthrates in developing countries.
Mission	Evangelism & Good works (often abroad)
Open Doors	Charity working for the persecuted church

Science - B5. Health Disease and the Development of Medicine

Health and disease

- The world health organisation (WHO) defines health as **"a complete state of mental, physical and social well being".**
- Communicable disease can be passed from one person to another e.g. 'flu' or measles.
- Having one disease (such as HIV which damages your immune system) might make you more likely to catch another disease (e.g. pneumonia).

Non – communicable disease

Non communicable disease are not passed on from one person to another. They are caused by problems in the body or lifestyle.

Examples include: genetic disease (cystic fibrosis), deficiency diseases (scurvy) and lifestyle diseases (liver disease caused by alcohol).

Communicable disease

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Examples include: genetic disease (cystic fibrosis), deficiency diseases (scurvy) and lifestyle diseases (liver disease caused by alcohol).

Cardiovascular disease is disease of the heart and circulatory system. Being obese, and smoking increase the risk. It can be treated by surgery (stents), medication or changes to lifestyle.
BMI and waist: hip ratio can be used to monitor body fat/ obesity.

Disease	Symptoms	Caused by	Spread by
Cholera	Diarrhoea	Bacteria	Water
Tuberculosis	Lung damage	Bacteria	Airborne
Chalara ash dieback	Leaf loss, bark lesions	Fungi	Airborne
Malaria	Damage to blood and liver	Protists	Animal vectors (mosquitoes)
HIV	Destroys white blood cells, leads to AIDS	Virus	Body fluids, can be sexually transmitted.
Stomach ulcers (Helicobacter)	**Stomach pain, ulcers**	**Bacteria**	**Oral transmission**
Ebola	**Haemorrhagic fever**	**Virus**	**Body fluids**

Physical and chemical barriers

Physical – skin, mucus and ciliated cells.

Chemical – lysozyme (in tears) and hydrochloric acid

Sexually transmitted infections can be prevented by the use of **barrier contraceptives** such as a condom.

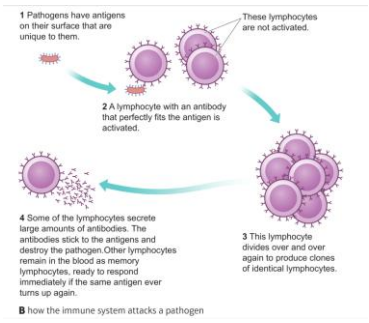
Pathogens are disease causing organisms for example: viruses, bacteria, fungi and protists.

Pathogens can be spread by water, air, blood and body fluids and by contact.

Antibiotics only work against bacteria. Many bacteria are now resistant to antibiotics.
The stages in developing a new medicine are:
pre-clinical (testing on cells and tissues)
Testing on animals
Clinical trial on a few, healthy, people.
Large clinical trial on people with the disease.

Immune system

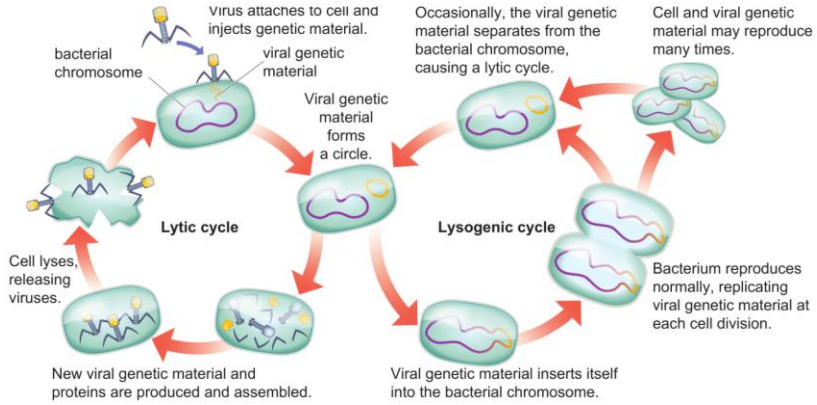
Vaccinations work by giving you a dead or weekend form of the pathogen.



B how the immune system attacks a pathogen

Science - B5. Health Disease and the Development of Medicine
Separate science only

Virus life cycles



C the lytic and lysogenic pathways in the life cycles of some types of virus

Plant defences

Physical: Bark, waxy cuticle, cellulose walls, thorns/spines, hairs, drooping leaves (Mimosa).
Chemical: Poisons (nettles, foxgloves), induced toxins (aphid attack), antibacterial chemicals (mint, witch hazel).
Other: Genetic engineering for resistance.

Identifying Plant Diseases

Visible Symptoms: spots, discoloration, wilting, lesions.

Distribution Analysis Pattern of spread helps identify source:

Random → wind/insect-borne
Clustered near roots → soil-borne
Edges of field → pests/machinery.

Diagnostic Testing -Lab tests confirm pathogen

Monoclonal Antibodies are identical antibodies produced from a single type of immune cell; they target one specific antigen.

Inject antigen into a mouse → stimulates lymphocytes.

Fuse lymphocytes with tumour cells → create hybridoma cells.

Hybridomas divide and produce monoclonal antibodies.

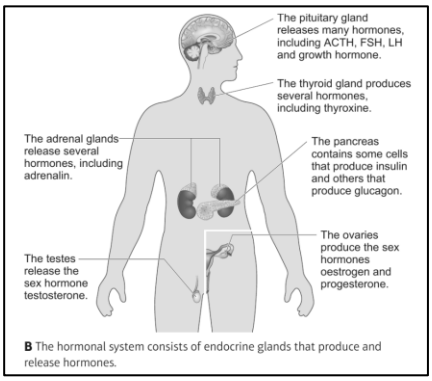
Uses:
Medical diagnosis: Pregnancy tests, detecting infections, cancer markers.
Treatment: Target cancer cells, deliver drugs, or trigger immune response.
Other: Locate blood clots, infections using imaging.

Antiseptic core practical:
Prepare plate → Add bacteria → Apply discs → Incubate → Measure zones → Graph results

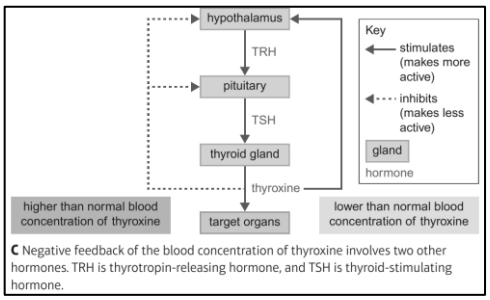
Science - Animal coordination, control and homeostasis

Hormones
Hormones are chemical messengers, produced in glands and carried around your body in your blood.

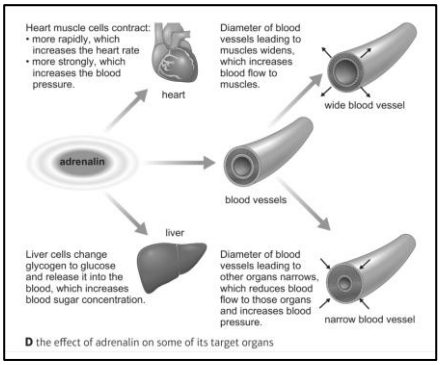
Hormonal control of metabolic rate (higher only)
Your metabolic rate is the rate at which energy stored in food is transferred by reactions in your body. Two important hormones are thyroxine and adrenaline.



B The hormonal system consists of endocrine glands that produce and release hormones.



C Negative feedback of the blood concentration of thyroxine involves two other hormones. TRH is thyrotropin-releasing hormone, and TSH is thyroid-stimulating hormone.



D the effect of adrenalin on some of its target organs

The menstrual cycle is a recurring process that takes around 28 days. The lining of the uterus is prepared for pregnancy. If implantation of the fertilised egg does not happen, the lining is then shed. This is known as Menstruation (a period).
Oestrogen and progesterone are important for this process.

Contraception – hormonal methods are more effective at preventing pregnancy but they don't stop the transmission of STIs.

Method and success rate (% of pregnancies prevented)	How it prevents fertilisation
male condom (98% success rate)	placed over erect penis, prevents sperm entering the vagina
diaphragm or cap (92–96% success rate)	placed over the cervix (entrance to the uterus), prevents sperm in the vagina entering the uterus
hormone pill or implant placed under the skin (>99% success rate)	release hormones to prevent ovulation and thickens mucus at the cervix, making it difficult for sperm cells to pass through

D different contraceptive methods and their success rates if used correctly

Control of blood glucose involves two hormones.
Insulin is produced in the pancreas and causes the liver to take up glucose from the blood.
Glucagon (higher only) causes the liver to convert glycogen to glucose.
In **type 1 diabetes** the pancreas does not produce insulin. Type 1 diabetics need to monitor their blood and inject insulin.

Type 2 diabetes is caused by the pancreas not producing enough insulin or the target organs becoming resistance to insulin.
Obesity increases the risk of type 2 diabetes.
It can be treated with tablet, insulin injections or controlling the diet.

Hormonal control of the menstrual cycle (higher only)

FSH (Follicle Stimulating Hormone) – Stimulates an egg to mature in the ovary and promotes oestrogen production.
Oestrogen – Stops further FSH production, repairs and thickens the uterus lining, and triggers LH release.
LH (Luteinising Hormone) – Causes ovulation (the release of a mature egg).
Progesterone – Maintains the uterus lining after ovulation and during pregnancy

Assisted reproductive technology (higher)

IVF - FSH and LH are used to stimulate the maturation of several eggs, they are collected from the mother and fertilised by sperm from the father in a laboratory, the fertilised eggs develop into embryos, one or two embryos are inserted into the uterus.

Clomifene is used as a fertility drug to stimulate ovulation by blocking the action of oestrogen on LH. More LH is released in a surge. This mimics the LH surge which occurs just before ovulation.

Science - Animal coordination, control and homeostasis – separate biology only

Thermoregulation is the process by which the body maintains its core temperature (around 37°C) so that enzymes and metabolic processes function properly. It is controlled by the **hypothalamus**.

When body temperature rises above 37°C

- Vasodilation: Blood vessels near the skin widen, increasing blood flow to the surface so heat can be lost by radiation.
- Sweating: Sweat glands produce sweat, which evaporates and cools the body.

When body temperature falls below 37°C:

- Vasoconstriction: Blood vessels near the skin narrow, reducing heat loss.
- Shivering: Muscles contract rapidly, generating heat through respiration.
- Hair erector muscles contract: Traps a layer of insulating air.

This is a negative feedback system.

Osmoregulation controls water balance in the body to keep blood concentration stable.

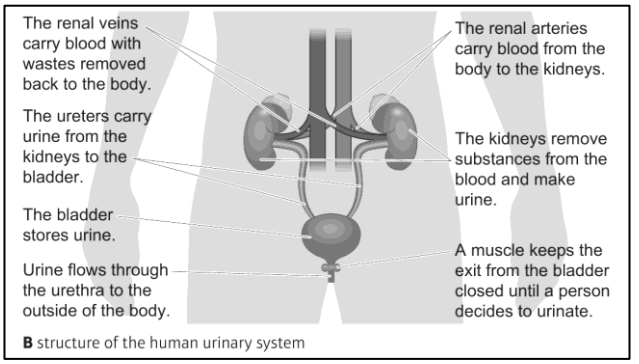
•**Kidneys** filter blood and adjust water reabsorption.

•If blood is **too concentrated**: more water reabsorbed → urine is small and concentrated.

•If blood is **too dilute**: less water reabsorbed → urine is large and dilute.

•Controlled by **ADH** from the pituitary gland.

•Kidney failure disrupts this process; dialysis or transplant restores balance.



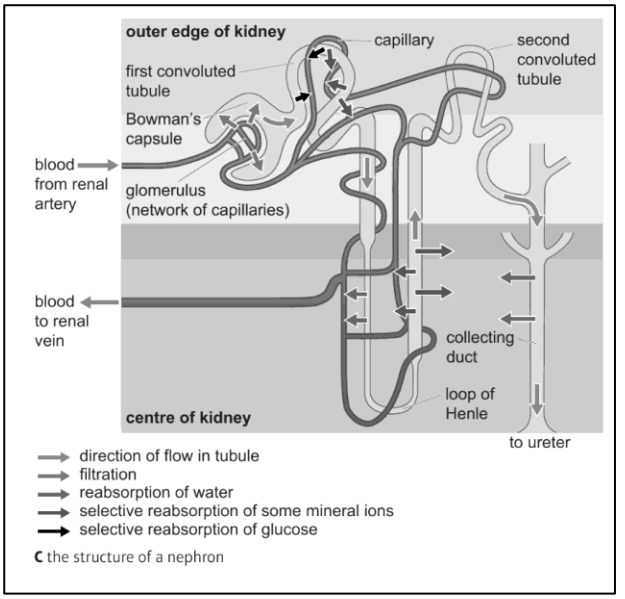
B structure of the human urinary system

Kidneys filter blood in nephrons.

Selective reabsorption occurs in tubules:

- Water and useful substances are reabsorbed into the blood.
- Waste and excess water form urine.

Amount of water reabsorbed depends on body's needs.



C the structure of a nephron

ADH (antidiuretic hormone) is released by the pituitary gland when blood water level is low.

ADH makes kidney tubules more permeable, so more water is reabsorbed.

Less ADH → tubules less permeable → more water lost in urine.

C8: Acids and alkalis knowledge organiser

1 Acids alkalis and indicators

Acids contain Hydrogen ions H^+

The common acids that you will come across at GCSE are

Hydrochloric acid	HCl
Sulphuric acid	H_2SO_4
Nitric acid	HNO_3

These are all acids as they produce hydrogen ions H+ in solution

An indicator is a substance which changes colour in acid/alkali

pH	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Colour of Universal Indicator	Highly acidic			weakly acidic			neutral		weakly alkaline				Highly alkaline	
	Red		orange		yellow		green			purple				blue

Universal indicator is not good for doing titrations. For this you need either Phenolphthalein or methyl orange

Indicator	Colour in acid	Colour in alkali
Phenolphthalein	Colourless	pink
Methyl orange	Red	yellow

3 Bases

A base is a metal oxide or hydroxide e.g. CuO or $Ca(OH)_2$

Bases can neutralise acids to give salt and water only

A salt can be made by the reaction of an acid and a base. For example you can make copper sulphate by reacting copper oxide with sulphuric acid

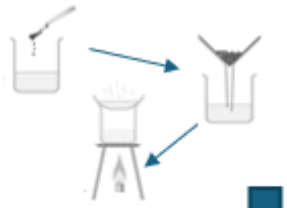
Hydrochloric acid	Makes Chlorides
Sulfuric acid	Makes Sulphates
Nitric acid	Makes Nitrates

General equation: **base + acid → salt + water** **BASHO**

Word equation: copper oxide + sulfuric acid → copper sulfate + water

Symbol equation: $CuO + H_2SO_4 \rightarrow CuSO_4 + H_2O$

- Add excess base to acid to neutralise all the acid
- Filter off the excess base
- Evaporate the water from the solution to get crystals of the salt



4 Alkalis and neutralisation

An alkali is a base that is soluble in water e.g. NaOH

Alkalis produce hydroxide ions (OH-) when dissolved in water

acid + alkali → salt + water

Hydrochloric acid + sodium hydroxide → sodium chloride + water

$HCl + NaOH \rightarrow NaCl + H_2O$

In neutralisation reactions hydrogen ions from the acid (H+) react with hydroxide ions from alkali (OH-) to make water

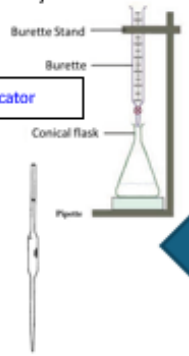
$H^+ + OH^- \rightarrow H_2O$

5 Titration

To make a salt from an acid and an alkali you need to use a titration

- Using a **pipette** add alkali into a **conical flask**
- Add a few drops of **indicator**
- Add acid from a **burette** slowly until the indicator changes colour. Record the volume of acid.
- Repeat the experiment with no indicator.
- Evaporate the water from the solution to leave the salt

Not universal indicator



6 Acid and metal

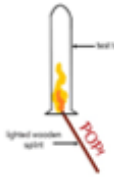
Acids can be neutralised with metals. If the metal is reactive enough hydrogen gas is produced.

metal + acid → salt + hydrogen

magnesium + hydrochloric acid → magnesium chloride + hydrogen

$Mg + 2HCl \rightarrow MgCl_2 + H_2$

The test for hydrogen gas it that it makes a squeaky pop when a lit split is added



7 Acid and metal carbonate

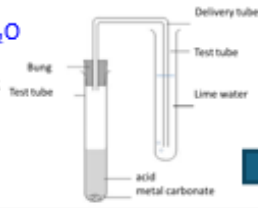
Acids can be neutralised with metal carbonates. In this case carbon dioxide gas is produced.

metal carbonate + acid → salt + water + carbon dioxide

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

$CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O$

The test for carbon dioxide gas is that lime water turns milky when carbon dioxide is bubbled through it



8 Precipitation reactions

Salts that are insoluble can be made using precipitation reactions.

A precipitate is a solid that is formed from two solutions.

Lead nitrate + potassium iodide → lead iodide + potassium nitrate

$Pb(NO_3)_2 (aq) + 2KI (aq) \rightarrow PbI_2 (S) + 2KNO_3 (aq)$

insoluble salt from a precipitation reaction simply mix the two solutions together, filter off the precipitate (salt) and dry

Solubility Rules
To know if a salt is soluble in water or not you need to learn your solubility rules
All group one metals salts are soluble
All nitrates are soluble etc.

9 Summary – Acids and making salts

To make soluble salts neutralise acids use one of the 3 methods.

base + acid → salt + water

metal + acid → salt + hydrogen

metal carbonate + acid → salt + water + carbon dioxide

To make an insoluble salt use a precipitation reaction and use solubility rules to determine which.

You need to able to

- Know the names and formulas of common acids
- Know the colour changes for indicators in acid and alkali (not just UI)
- Write word equations for the neutralisation reactions
- Describe methods for making soluble and insoluble salts

Science - C9 calculations involving masses

Masses and empirical formulae

- The **empirical** formula is the simplest whole number ratio of atoms or ions of each element in a substance.
- The **molecular** formula represents the actual number of atoms of each element in one molecule.
- For example, ethene:
  Molecular formula = C_2H_6
  Empirical formula = CH_3

Finding the empirical formula from data:

Write the element symbols						
Write the masses						
Write the A_r values						
Divide masses by A_r						
Divide by the smallest number						
Write the empirical formula						

Conservation of mass

Law of conservation of mass: When a solid is dissolved in a solvent the mass of the solution is equal to the mass of the solid + the mass of the solvent. In a reaction, the mass of the reactants is equal to the mass of the products.

Concentration = $\frac{\text{mass of solute in g}}{\text{volume of solution in dm}^3}$

One dm^3 = 1 litre

You can use the relative masses and the balanced symbol equation to calculate the mass of the reactant or product.

Worked example

Calculate the mass of chlorine needed to make 53.4 g of aluminium chloride.

Write the balanced equation	$2Al + 3Cl_2 \rightarrow 2AlCl_3$
Calculate relative formula masses of the substances needed	$M_r\ Cl_2 = 2 \times 35.5 = 71$ $M_r\ AlCl_3 = 27 + (3 \times 35.5) = 133.5$
Calculate ratio of masses (multiply M_r values by the balancing numbers shown in the equation). $3Cl_2$ makes $2AlCl_3$ so $3 \times 71 = 213$ g Cl_2 makes $2 \times 133.5 = 267$ g $AlCl_3$	
Work out the mass for 1 g of reactant or product. (Here we want 1 g of the product because that's the mass we know already.) ÷ 267: $\frac{213}{267}$ g Cl_2 makes $\frac{267}{267}$ g $AlCl_3$ ÷ 267 0.798 g Cl_2 makes 1 g $AlCl_3$ × 53.4: 42.6 g Cl_2 makes 53.4 g $AlCl_3$ × 53.4	
Scale up or down (*from* 1 g *to* the mass you are given)	

Moles and mole calculations – Higher only

A mole (mol) is a unit for counting particles.
One mole = 6.02×10^{23}. This is Avogadro's constant.

Number of moles of a substance = $\frac{\text{mass of a substance (g)}}{A_r \text{ or } M_r}$

In a reaction a reactant may be added in **excess** and not all used up. The one that is all used up is the **limiting reactant.**

If you know the mass of each substance in a reaction you can calculate the number of moles of each and so work out the rations for the balanced equation. The ratio of the moles is called the **stoichiometry** of the reaction.

Science - C10 electrolysis

What is electrolysis?

An ionic solution with freely moving ions is called an **electrolyte.**

Electrolysis uses an electric current to decompose (breakdown) an ionic solution.

Cations are positive ions and are attracted to the negative cathode.

Anions are negative ions and are attracted to the positive anode.

Potassium	Most reactive	K
Sodium		Na
Lithium		Li
Calcium		Ca
Magnesium		Mg
Aluminium		Al
Carbon		C
Zinc		Zn
Iron		Fe
Hydrogen		H
Copper		Cu
Silver		Ag
Gold	Least reactive	Au

Core practical – you can also do this using graphite electrodes.

Method

Using copper electrodes

Wear eye protection.

A Select two clean pieces of copper foil. Label one 'anode' and the other 'cathode'. Measure and record the masses of the two electrodes.

B Set up an electrolysis circuit as shown in diagram B.

C Turn on the power and adjust the variable resistor to give a current of about 0.2 A. Record the current and adjust the variable resistor to keep it constant. Leave the power on for 20 minutes.

D Turn off the power and remove the electrodes from the beaker. Gently wash the electrodes with distilled water then dip them into propanone. Lift the electrodes out and gently shake off the propanone. Allow the remainder of the propanone to evaporate.

E Measure and record the masses of the dry electrodes.

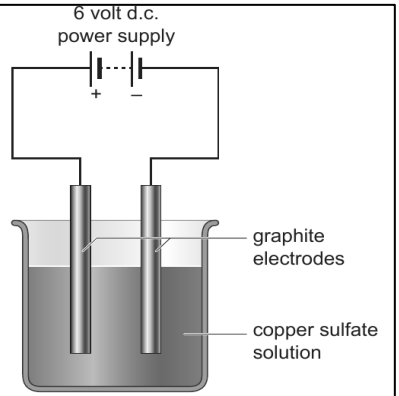
F Repeat the experiment using currents of 0.3 A, 0.4 A and 0.5 A.

Electrolysis of a dissolved ionic compound.

At the **Cathode.** If the metal ion is less reactive than hydrogen, the metal is deposited.

If the metal ion is more reactive than hydrogen, hydrogen gas is produced.

At the anode: If halide ions (Cl^-, Br^-, I^-) are present, the corresponding halogen (Cl_2, Br_2, I_2) is produced. Otherwise, oxygen gas is produced from hydroxide ions (OH^-).



C electrolysis circuit for using graphite electrodes

OIL RIG - **O**xidation **I**s **L**oss of electrons, **R**eduction **I**s **G**ain of electrons.

Oxidation and reduction – higher only

Oxidation = **loss of electrons**
Reduction = **gain of electrons**
Cathode (negative electrode): Reduction occurs (ions gain electrons).
Anode (positive electrode): Oxidation occurs (ions lose electrons).

Half equations:
At the Cathode (Reduction):
General rule: Positive ions gain electrons.
Example:

$$Na^+ + e^- \rightarrow Na$$

At the Anode (Oxidation):
General rule: Negative ions lose electrons.
Example:

$$2Cl^- \rightarrow Cl_2 + 2e^-$$

Science - P4 – Waves (combined and separate)

Describing waves

Waves **transfer energy** and information **without transferring matter**.

Key words to describe waves:

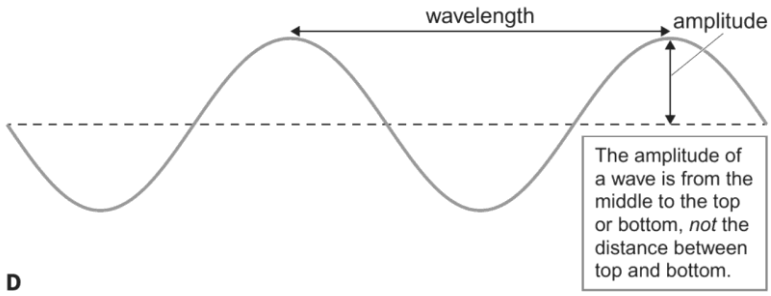
Frequency = the number of vibrations per second.

Wavelength = The distance between a point on one wave and the same point on the next wave.

Amplitude = The size of vibrations or the maximum distance a particle moves away from its resting position when a wave passes.

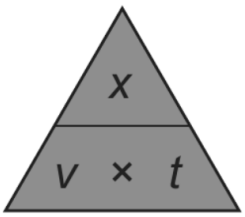
Period = The time taken for one complete wave to pass a point. It is measured in seconds.

Wave velocity = The speed of a wave in a particular direction.



D

Transverse waves	Longitudinal waves
Vibrations are perpendicular to the direction of energy transfer. e.g. UV waves (and all waves in the em spectrum) & Seismic s waves Don't need material to travel in.	Vibrations are parallel to the direction of energy transfer. E.g. Sound and ultrasound waves & Seismic P waves Need material to travel in.



Wave speed

You don't need to memorise these equations, but you do need to know how to use them.

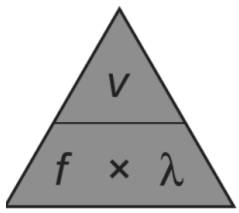
wave speed (m/s) = frequency (Hz) =x wavelength (m)

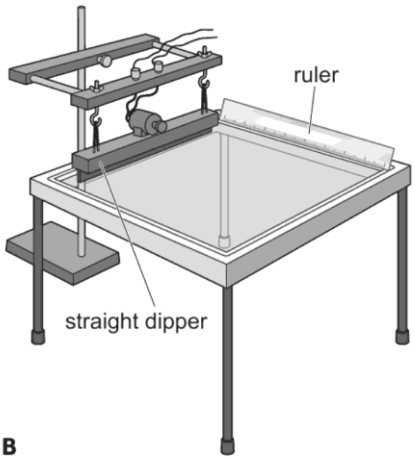
$v = f \times \lambda$

wave speed (m/s) = distance (m) ÷ time (s)

$v = x/t$

You can use a ripple tank to calculate wave speed.



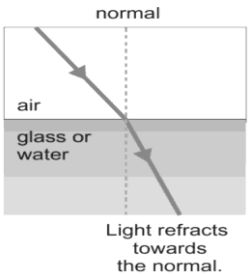


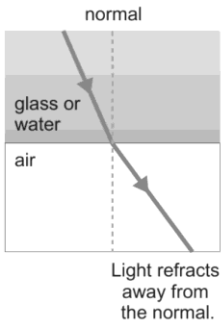
B

Refraction

Refraction is the change in direction when waves go from one medium to another.

(Higher only) When light hits glass at an angle, it slows down and bends because it's moving from air (faster) into glass (slower). One side of the light enters first and slows down, so the whole ray turns towards the normal (an imaginary line at 90° to the surface).



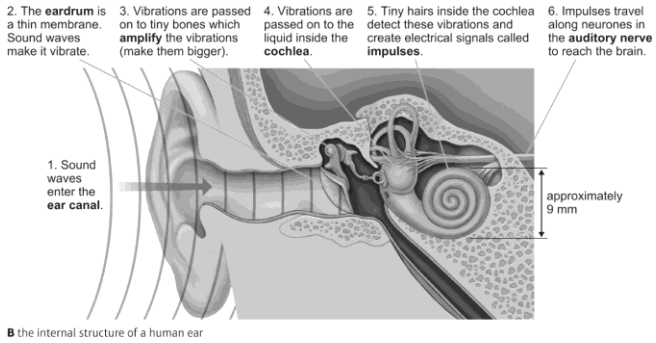


Science - P4 – Waves (separate only)

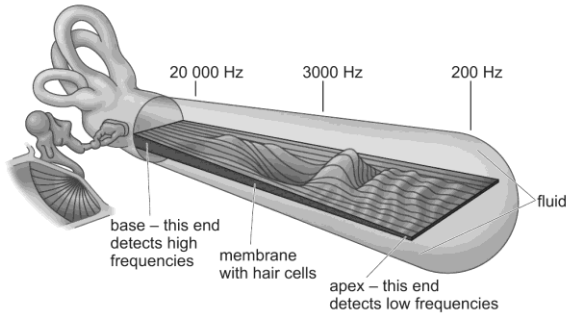
Waves crossing boundaries

When waves cross a boundary between two materials they can be:

Reflected - the wave bounces off.
Refracted – the waves passes into the new material but changes direction.
Transmitted – the wave passes through the material and is not absorbed or reflected.
Absorbed - the disappears as the energy it is carrying is transferred to the material.



B the internal structure of a human ear



Ears and hearing

Sound waves are caused by vibrating objects. They pass through the medium by a series of compressions and rarefactions. When a sound wave travels through a solid it causes the particles to vibrate.

Not all frequencies of sound can be transmitted through an object. The **object's size, shape and structure** determines which frequencies it can transmit.

Human hearing is limited by the **size and shape** of our eardrum and the **structure** of the parts that vibrate.

Ultrasound

Sound with frequencies **greater than 20 000 hertz**, Hz, is known as ultrasound.

Ultrasound waves are **partially reflected** at boundaries.

Uses of ultrasound include:
Industrial Imaging – finding flaws in materials
Medical imaging e.g. baby scans.
Sonar.

Infrasound

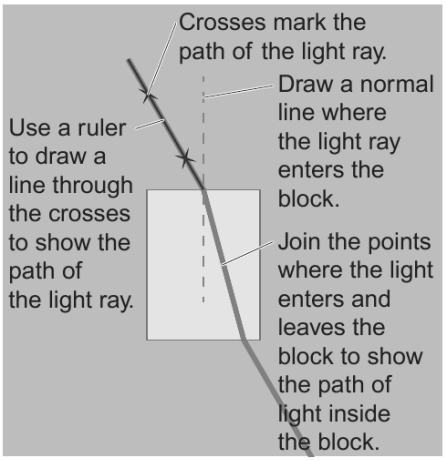
Sound with frequencies **less than 20 hertz**, Hz, is known as infrasound.

Uses of infrasound include **exploration of the Earth's core.**

- Earthquakes produce seismic waves that are infrasound waves
- There are two types – S and P waves.
- P waves can travel through the Earth's core, S waves can't.

Science - P5 light and the EM spectrum

- **Refraction core practical**
- Place paper and outline the glass block.
- Shine a single light ray through the block; mark entry and exit points.
- Remove block, draw the light path, and measure angles.
- Repeat for different angles.
- Test with the ray entering at a right angle and observe.



Electromagnetic waves

- Electromagnetic (EM) waves:
- are transverse waves.
- transfer energy as radiation
- can travel through a
- vacuum
- travel at the same speed through a vacuum or the air
- travel at 300,000,000 m/s)

Electromagnetic spectrum

This includes:

- waves with a very short wavelength, high frequency and high energy and
- waves with a very long wavelength, low frequency and low energy.

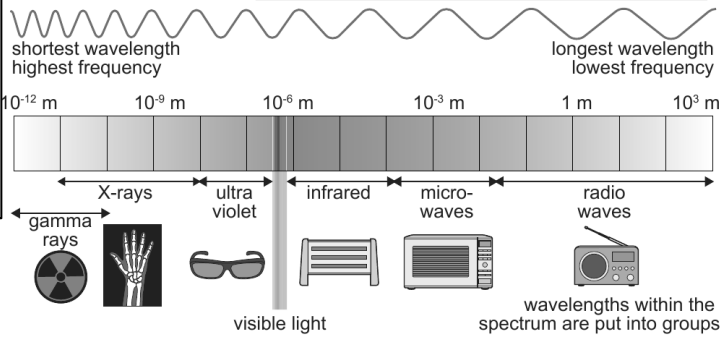
Dangers of em radiation - Ionising radiation

Ultraviolet waves, X-rays and gamma rays are types of ionising radiation.

They can add or remove electrons from molecules, producing electrically charged ions. Ionisation can have hazardous effects on the body:

Ultraviolet waves can cause damage to skin cells and eyes, and increase the risk of skin cancer.

X-rays and gamma rays can cause the mutation of genes, which can lead to cancer



B the electromagnetic spectrum (not to scale)

Uses of Long Wavelengths

- Radio waves (longest wavelength, lowest frequency)
  - Used for radio and TV broadcasting, mobile phone signals, and communication with aircraft and spacecraft.
- Microwaves (shorter than radio waves, but still long)
  - Used for cooking food (microwave ovens) and satellite communications.
  - Transfers energy to food, heating it up.
- Infrared (shorter than microwaves, higher frequency)
  - Used in remote controls, thermal imaging, and heating.
  - Transfers energy as heat and can detect temperature differences.

Uses of Short Wavelengths

•Ultraviolet (UV)

- Used for sterilising equipment and disinfecting water by killing bacteria.
- Also used in security markings (fluorescent inks).

•X-rays

- Used for medical imaging (seeing inside the body, e.g., bones and teeth).
- Also used for security scanning (e.g., luggage at airports).

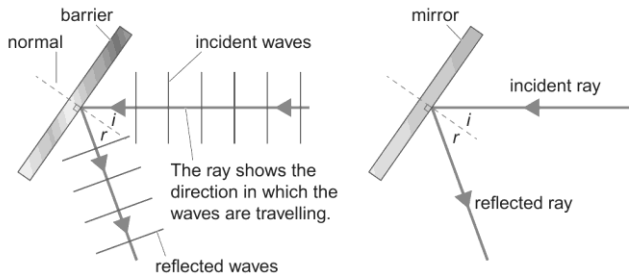
•Gamma rays (shortest wavelength, highest frequency)

- Used for killing cancer cells in radiotherapy.
- Also used for sterilising medical instruments.

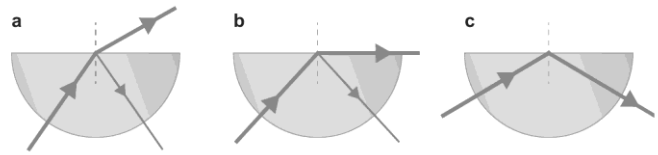
Higher only: Microwaves pass easily through the atmosphere, so they can pass between stations on Earth and satellites in orbit.

Science - P5 light and the EM spectrum – separate only

Ray diagrams can be used to model what happens when light is reflected or refracted**.**



A water waves reflected by a barrier and light waves reflected by a mirror

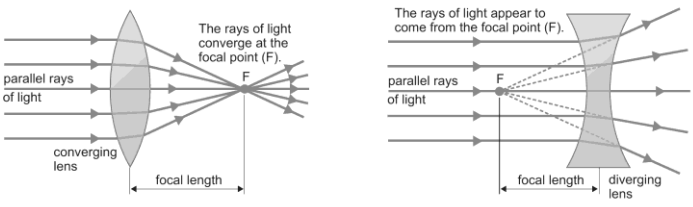


C light passing through a semi-circular glass block, showing total internal reflection and the critical angle

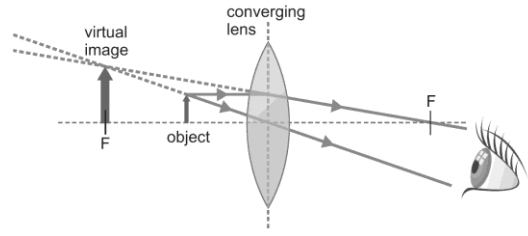
Colour

•**Opaque objects:** Absorb some wavelengths, reflect others → reflected colours are what we see.
Example: Grass reflects green, absorbs other colours.
•**Transparent:** Transmit light (glass, water).
•**Translucent:** Partly transmit light (lampshades).
•**Filters:** Transmit their own colour, absorb others.
•**Coloured light:** If no matching wavelength to reflect → object looks black.

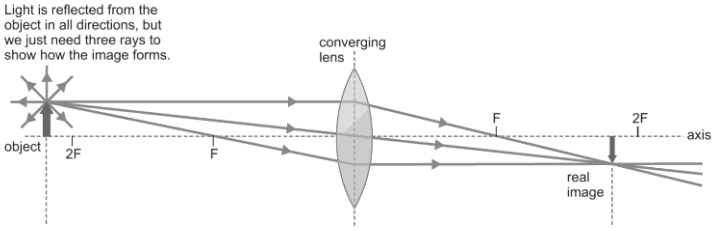
Lenses A lens is a shaped piece of transparent glass or plastic that refracts light.
When light is refracted, it changes direction due to the change in density as it moves from air into glass or plastic.
Lenses are used in cameras, telescopes, binoculars, microscopes and corrective glasses. A lens can be convex or concave.



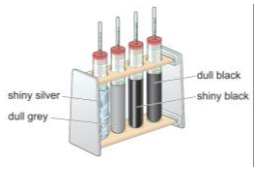
B



D a ray diagram showing a converging lens being used as a magnifying glass



C A converging lens forms a real image of a distant object.



Core practical – investigating radiation

Cover boiling tubes with different coloured materials, fill each with the same amount of hot water, insert thermometers, and record temperatures every 2 minutes for 20 minutes.

Radiation and Temperature

•Objects emit radiation; intensity increases with temperature and depends on wavelength.
•**Earth's energy balance:**
- Sun's radiation absorbed by Earth's surface, atmosphere, and clouds.
- Some radiation reflected back into space.
- Greenhouse gases absorb and re-radiate infrared radiation, keeping Earth warm.

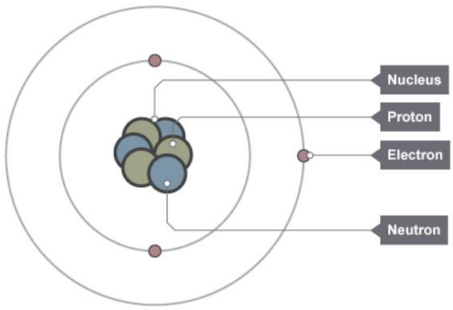
•**Constant temperature:**
- Achieved when energy absorbed equals energy emitted.

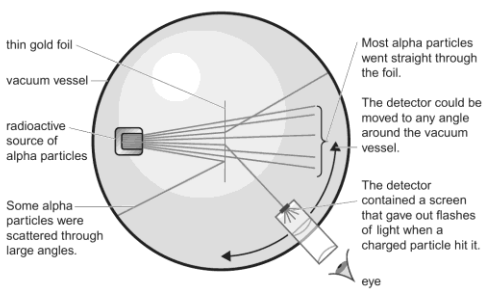
•**Atmosphere effect:**
- Without greenhouse gases, Earth would be much colder.
- Human activities increase greenhouse gases → more heat trapped → global warming

Science - P6 Radioactivity

Atoms are very small, they have a radius of around 1×10^{-10} metres.

- The modern view of the atom is of a positively-charged nucleus containing **protons** (charge +1, mass 1) and **neutrons** (no charge, mass 1) with smaller **electrons** (charge -1, mass negligible) orbiting outside the nucleus.
- Isotopes of an atom have the same atomic (proton) number but different mass numbers because they have a different number of neutrons.





C the design of one of Rutherford's experiments

Developing the model

J J Thomson discovered the electron in 1897 and proposed that the atom looked like a plum pudding.

Ernest Rutherford, 1905, directed a beam of alpha particles at a very thin gold leaf suspended in a vacuum. Most went straight through but some bounced back. He discovered the nucleus.

Niels Bohr, 1913, suggested that the electrons orbited the nucleus in different energy levels (shells).

James Chadwick discovered the neutron in 1932.

Types of radioactive decay An unstable nucleus can decay by emitting one or more of the following:

Alpha particle: If the nucleus is unstably large, it will emit a 'package' of two protons and two neutrons called an alpha particle. An alpha particle is also a helium-4 nucleus, written as $^{4}_{2}He$.

Beta minus decay: If the nucleus has too many neutrons, a neutron will turn into a proton and emit a fast-moving electron, from the nucleus, called a beta minus (β-) particle. A beta particle has a relative mass of zero, and a charge of -1.

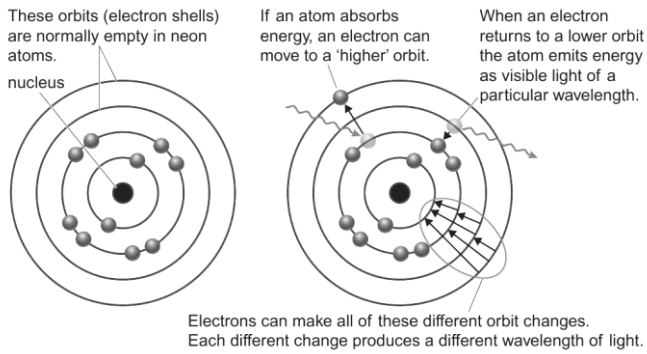
Positron (ß+) emission: If the nucleus has too few neutrons, a proton will turn into a neutron and emit a fast-moving positron, called a beta plus (β+) particle. Its mass number is zero, but a +1 relative charge.

Gamma ray: A re-arrangement of the particles in a nucleus can move the nucleus to a lower energy state. The difference in energy is emitted as a very high frequency electromagnetic wave called a gamma ray.

Neutron emission Occasionally it is possible for a neutron to be emitted by radioactive decay.

Electrons and orbits

Bohr proposed electrons orbit in fixed energy levels, explaining flame colours and energy patterns.
Electrons absorb energy, move to higher levels, then fall back, releasing light of specific frequencies.

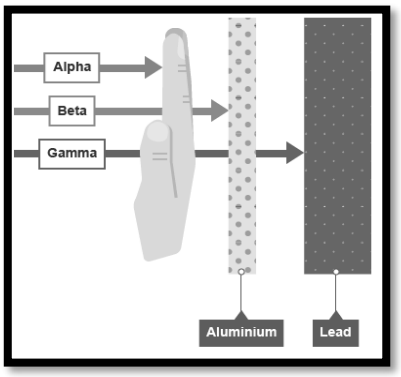


B electronic configuration and energy level changes for neon

Background radiation is the low-level radiation we are constantly exposed to from natural and artificial sources.

- Natural: cosmic rays, rocks (radon gas), soil, food, and even our bodies.
- Artificial: medical treatments, nuclear industry, and fallout from weapons testing.

Measurement: Geiger–Müller tubes detect radiation by counting particles per second.



Particle	Symbol	
alpha	α	$^{4}_{2}He$
beta	β^-	$^{0}_{-1}e$
positron	β^+	$^{0}_{+1}e$
neutron		n

D symbols used in nuclear equations

Nuclear equations: A nucleus changes into a new element by emitting nuclear radiations; these changes are described using nuclear equations.

Alpha decay $^{219}_{86}Rn \rightarrow ^{215}_{84}Po + ^{4}_{2}He$

Beta decay $^{14}_{6}C \rightarrow ^{14}_{7}N + ^{0}_{-1}e$

Dangers of radiation

Tissue damage. & damage to DNA.
Irradiation = exposure to alpha, beta or gamma radiation.
Contamination = particles of radioactive material on your skin or body.
Safety precautions are radiation detection badges, masks, & safety suits.

Radioactivity and half lives

The activity of a radioactive substance is measured in Becquerel (Bq). One Becquerel is equal to one nuclear decay per second. Half-life is the time it takes for half of the unstable nuclei in a sample to decay . it cannot be predicted when a particular nucleus will decay but half-life enables the activity of a very large number of nuclei to be predicted during the decay process .

P6 Radioactivity – separate only

Uses of Radioactivity
Sterilisation Irradiating food (e.g., fruit) with gamma rays to kill microorganisms and prevent spoilage. Sterilising surgical instruments without heat.
Detecting faults: Gamma sources used to find cracks in pipelines or structural materials.
Checking thickness: Beta radiation monitors thickness of paper, foil, or metal sheets.
Smoke Alarms Alpha particles from americium-241 detect smoke by disrupting ionised air in the sensor.
Cancer treatment Gamma rays (gamma knife) target and kill tumours deep inside the body.
Internal radiotherapy using isotopes like iodine-131 placed inside or near tumours.
Diagnosis with gamma rays
Radioactive tracers (e.g., technetium-99m, iodine-123) used to image organs and detect conditions.
Diagnosis with positrons (PET scans):Positron-emitting tracers show metabolic activity and help identify cancer cells.

Nuclear Fission: Splitting a large nucleus (e.g., uranium-235) into smaller nuclei.
A neutron hits the nucleus → it becomes unstable → splits into two daughter nuclei + 2–3 neutrons. Released neutrons cause further fission → chain reaction. Energy: Most energy carried by fast neutrons; used to heat water and drive turbines in reactors. Fuel rods (uranium/plutonium), moderator (slows neutrons), control rods (absorb neutrons), coolant, and concrete shielding. Uses: Power stations, but produces long-lived radioactive waste. Risk: Uncontrolled reaction = atomic bomb.

Nuclear Fusion Joining two light nuclei (e.g., hydrogen isotopes) to form a heavier nucleus (helium). Occurs in stars under extreme temperature and pressure. Mass is lost and converted to energy ($E = mc^2$).Challenge: Requires 100–200 million °C on Earth to overcome electrostatic repulsion. Achieved experimentally (e.g., JET near Oxford) but not yet economically viable. Huge energy output, minimal radioactive waste.

Statistics
2b: Continuous data

Population pyramids

- **Population pyramids** are similar to stem and leaf diagrams. They show the age groups in a population, usually divided by gender.

Choropleth map

- A **choropleth map** is used to classify regions of a geographical area. Regions are shaded with an increasing depth of colour. A key shows what each shade represents.
- A choropleth map can be a diagram rather than an accurate map.

Histogram

- A **histogram** is similar to a bar chart but, because the data is continuous, there are no gaps between the bars.

H

- To draw a **histogram for unequal class intervals**, adjust the height of the bars so the **area** of the bar represents the frequency. The height of each bar represents the **frequency density**.
- Frequency density = $\frac{\text{frequency}}{\text{class width}}$
- You can compare data from histograms if they have the same class intervals and the same frequency density scales.

Frequency polygons

- A **frequency polygon** joins the midpoints of the tops of the bars of a histogram with straight lines. A frequency polygon may be drawn with or without a histogram.

Cumulative frequency

- **Cumulative frequency** is the running total of the frequencies from each class interval.
- For discrete data, you can draw a **cumulative frequency step polygon**. Plot the cumulative frequencies against the upper class boundaries. Join the steps with straight lines.
- For grouped continuous data, you can draw a **cumulative frequency diagram**. Plot the cumulative frequencies against the upper class boundaries. Join the points with a smooth curve or straight lines.
- Cumulative frequency diagrams can be used to estimate or predict other values.

Distributions

- The **shape of a distribution** is the shape formed by the bars in a histogram, or by a frequency polygon, or by the rows of a stem and leaf diagram.
- A **distribution** can be **symmetrical**, or have **positive skew** or **negative skew**.

Misleading diagrams

- **Three-dimensional diagrams** make comparisons difficult as data proportions appear distorted.
- Diagrams without clear scales, labels or keys may be misleading.

Statistics

2a: Qualitative and discrete data

Pictograms, bar charts and vertical line graphs

- A **pictogram** uses symbols or pictures to represent a number of items.
- In a **bar chart**, bars are **equal width** with equal spaces between them. The height (or length) of the bar represents the **frequency**.
- A **vertical line graph** is similar to a bar chart, but uses lines instead of bars.
- **Multiple bar charts** have more than one bar for each class. A **key** shows what each bar represents. The frequencies of each category can easily be compared.
- A **composite bar chart** compares data for each category in a single bar, divided into components that show the frequency for each part. A key identifies each component.
  - The **total frequencies** and the frequencies of each component group can be compared.
- **Bar charts** and **vertical line graphs** show trends and patterns in data.

Stem and leaf diagrams

- A **stem and leaf diagram** shows numerical data split into a 'stem' and 'leaves'. The numbers are written in order. A key shows how to combine the stem and leaves to read the numbers.
- A stem and leaf diagram shows the shape of the data distribution in the same way as a bar chart, but retains the original data values.
- A **back-to-back stem and leaf diagram** shows two sets of data with the same stem. The smallest values on each row are always nearest the stem.

2b: Continuous data

Pie charts

- A **pie chart** is a way of displaying data when you want to show how something is shared or divided. Pie charts show proportions but not accurate data values.
- The **area of each sector** of a pie chart is proportional to the frequency it represents. The **area of the whole pie chart** is proportional to the total frequency.

H

- **Comparative pie charts** are used to compare two sets of data with different total frequencies.
  - The areas of the two circles should be **in the same ratio** as the two total frequencies.
  - To compare the **total frequencies**, compare the **areas**. To compare **proportions**, compare the individual **angles**.

Statistics
2c: Tabulation

Recording data

- A **database** is a collection of information.
- A **two-way** table shows information in two categories.
- **Tables** give exact data values for different categories, but do not show trends and patterns as clearly.
- **Bivariate data** has two variables.

Statistics
3a: Measures of central tendency

Averages

- When the number of data values, $\boldsymbol{n}$, is odd the **median** is the value of the $\frac{1}{2}(\boldsymbol{n}+1)$**th** observation. When $\boldsymbol{n}$ is even, the median is the mean of the two middle values.
- **Mean** $= \bar{x} = \frac{\sum x}{n}$
  - $\bar{x}$ is the mean of all the x values.
  - $\sum x$ is the sum of all the x values.
- The **mode** is the data item with the highest frequency.
- The data in a frequency table is written in order. The median is the $\frac{1}{2}(n+1)$th value.
- The **modal class** is the class with the highest frequency.
- For grouped continuous data, or for large data sets, the median is the $\frac{1}{2}n$th value.
- For grouped data, estimated median $= L + \frac{\frac{n}{2} - F}{f} \times w$ where:
  - L is the lower boundary of the class containing the median
  - n is the total number of values
  - F is the cumulative frequency of the intervals before the one containing the median
  - f is the frequency of the median class interval
  - w is the width of the median class interval.
- When all the data values are increased (or decreased) by the same amount or percentage, the averages are increased (or decreased) by the same amount or percentage.

Academic Vocabulary

Sequencing	Comparing
First (ly) Second (ly) Third (ly) Subsequently Finally In conclusion	Similarly Likewise Like In the same way Equally Akin to
Contrasting	**Qualifying**
Alternatively Conversely On the other hand In contrast Instead Besides	However Although But Except Notwithstanding Nonetheless
Supporting	**Emphasising**
Moreover Furthermore Also Additionally	Significantly Indeed Notably Significantly
Exemplification	**Time**
For example Such as Illustrated by For instance	Meanwhile Since Before After

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Projection

Project your voice so all that should hear can hear

Body Language

Use of gesture and position

Listen

Show you are actively listening

Good Talk

If you disagree, use respectful language

Eye Contact

Eye contact shows Belonging

SAYING OR STATING AN IDEA

I think ...

I strongly believe ...

It is my opinion that...

CLARIFYING OR CHECKING

Please could you clarify that?

Please could you explain what you mean?

SEEING THINGS FROM A DIFFERENT PERSPECTIVE OR VIEWPOINT

What if ...

Some people think ...

SUPPORTING OR AGREEING

I agree ...

I agree with Sarah because ...

CHALLENGING OR DISAGREEING

I have a different idea ...

I disagree ...

I would like to challenge something that Samia said ...

I would like to respectfully challenge ...

EXPANDING OR BUILDING ON

Adding to what Zack said ...

Building on what Ella said ...

I have been listening carefully, and I would like to add a new point ...

PARAPHRASING OR REWORDING

I think Mo is saying that ...

In other words, Matt is saying ...

THINKING ALOUD OR SHARING PARTIAL THINKING

Why is it that ...?

I am wondering if ...

I'm not certain but ...

I'm not completely sure but what I'm thinking is ...

JUSTIFYING OR GIVING REASONS

Because ...

If ... then ...

I know ... because ...

ASKING FOR THINKING TIME OR HELP

I'm not sure yet. Please can I have some time to think?

I'm a bit confused about ...

Please can I talk to a partner?

I'm stuck because ...

Please could you speak a bit louder?

Please could you repeat the question?

PASSING ON THE DIALOGUE

Ali, what do you think?

Ben, what do you think about what I said?

Jo, do you agree or disagree?

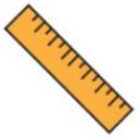
CONCLUDING OR END WORDS

My final thoughts are ...

There are lots of powerful arguments, but my own opinions is ...

For me, the strongest argument is ...

The Learning Eight

Pen (Blue or Black)		Ruler	
Pencil		Purple Pen	
Calculator		Knowledge Organiser	
Mini-Whiteboard		Whiteboard Pen