



AUTUMN KNOWLEDGE ORGANISER

YEAR 9

CONTENTS PAGE

Computer Science	1-4
Design Technology	5
Drama	6-7
English	8-9
Food Technology	10-13
Geography	14-17
History	18-20
Maths	21-24
Music	25-26
Religion and Ethics	27-29
Science	30-35
French	36-42



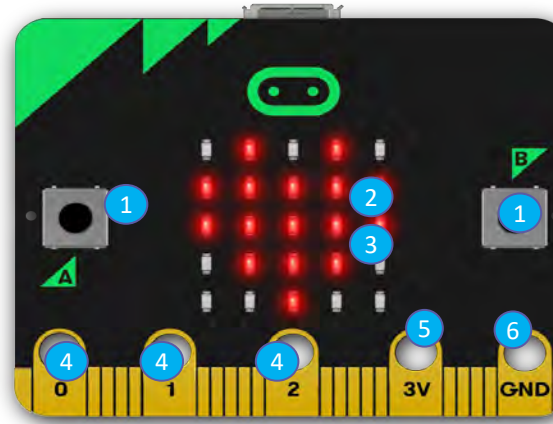
Computer Science Knowledge Organiser



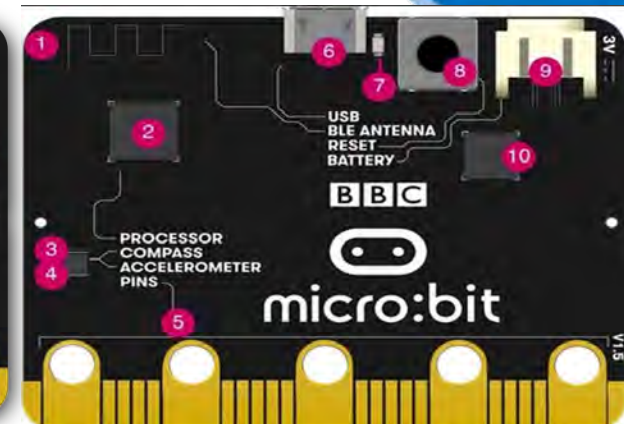
MICRO-BITS

The micro: bit is a pocket-sized computer that introduces you to how software and hardware work together. It has an LED light display, buttons, sensors and many input/output features that you can program and physically interact with.

Keywords	
Micro:bit	A small computer with a microprocessor that can execute a single program at a time.
Buttons	Capture user input and makes things happen
LED display (Light Emitting Diodes)	5x5 LED matrix output used to display information.
Light Sensor	Input, measures how much light is falling on the micro: bit.
GPIO (General-Purpose Input Output) pins	Input and output connects headphone, sense touch and add other electronics.
Temperature sensor	Input measures how warm the environment is.
Compass	Input, finds magnetic north or measures magnetic field strength
Accelerometer	Input detects gestures and measures movement in 3 dimensions.
Radio	Communication input and output allows communication with other devices
Algorithm	A set of instructions to be followed to complete a given task or solve a problem.
Program	A sequence of instructions used by a computer.
Sequence	The order which the computer will run code in, one line at a time.
Selection	A decision made by a computer, choosing what code should be run only when certain conditions are met.
Condition	Checking to see whether a statement or sum is true or false.
Iteration	When a section of code is repeated several times – also known as looping.
Variable	Something which can be changed in a computer. Made up of a name and some data to be saved.



1. **Buttons: input**
2. **LED display: output**
3. **Light sensor: input**
4. **Pins – GPIO: input/output**
5. **Pin - 3 volt power**
6. **Pin - Ground**



1. **Radio & Bluetooth antenna**
2. **Processor & temperature sensor**
3. **Compass**
4. **Accelerometer**
5. **Pins**
6. **Micro USB socket**
7. **Single LED**
8. **Reset button**
9. **Battery socket**
10. **USB interface chip**

Python is a **text based programming language**. That can be used to create programs, games, applications and much more!

A **program** is a set of precise instructions, expressed in a **programming language**.

Translating the programming language is necessary for a machine to be able to **execute** the instructions.

To execute a Python program, you need a **Python interpreter**. This is a program that translates and executes your Python program.

Python with data





Computer Science Knowledge Organiser



It is the law

Data Protection Act 2018:

All organisations and people using and storing personal data must abide by the DPA principles . It states how data should be stored/accessed and what rights a data subject has for the protection of their data.

Computer Misuse Act 1990: It is an offence to:

1. have unauthorised access to computer material
2. have unauthorised access with intent to commit or facilitate the commission of further offences
3. commit unauthorised acts with intent to impair, or with recklessness as to impairing, the operation of a computer.

Network and System security measures include:

Penetration testing

User permissions

User authentication

Auto updates

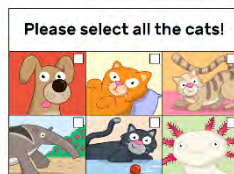
Anti-malware

passwords

firewall

biometrics

encryption



2

Cybersecurity looking at common attacks and methods to protect ourselves and our networks against these attacks.



Hacking in the context of cyber security is gaining **unauthorised** access to or control of a computer system .

Unethical versus ethical hacking
Penetration testers (pen testers) are people who are paid to legally hack into computer systems with the sole purpose of helping a company identify weaknesses in their system.

Key words

adware	advertises for products a user may be interested in, based on internet history
authentication	verifying the identity of a user or process
biometrics	'password' created from the user fingerprint, iris, retina, facial, voice
blagging	inventing a scenario to obtaining personal information
CAPTCHA	Completely Automated Public Turing Test To Tell Computers and Humans Apart
DoS/DDoS	Denial of Service attack/Distributed Denial of Service
encryption	mathematically converts data into a form that is unreadable without a key
firewall	checks incoming and outgoing network traffic for threats
hacking	gaining unauthorised access to or control of a computer system'
malware	a variety of forms of hostile or intrusive software
penetration testing	testing a network/program for vulnerabilities
pharming	redirecting web traffic to fake websites designed to gain personal information
phishing	messages designed to steal personal details/money/identity
ransomware	virus which locks a computer and encrypts files until a "ransom" is paid
script kiddies	hackers with no technical hacking knowledge using downloaded software
shouldering	directly observing someone enter personal details e.g. PIN number, password.
social engineering	manipulating people so they give up personal/confidential information
spyware	gathers information about a person or organisation without their knowledge
trojans	masquerades as having a legitimate purpose but actually has malicious intent
viruses	self-replicating software attached to another program/file
worms	Replicate and spread through the network

Computer Science Knowledge Organiser



IT AND THE WORLD OF WORK



Accessibility tools
Technology is transforming the way individuals with a disability access the world around them. This increases the opportunity for these individuals to successfully develop a career of their choice.

- Voice recognition that converts spoken word to digital text
- Screen readers that read screen text out loud
- Closed captioning or subtitles
- Motion or eye tracking
- Switch devices, which take the place of mice or keyboards



Reader pen

Keywords	
Local software	- Needs time to be installed on all computers - Licences may be bought for staff who do not use all of the available software in the package - Has to be maintained and updated by maintenance people - Users must be using the computer on which the software is installed
Cloud storage	- Files are stored on remote servers - When you want to access the file or media, they are downloaded or streamed to your device - Files or media can also be uploaded to the cloud for storage (useful for backups) - Files or media can be synchronised on more than one device so that each device has the same content - The amount of storage can be increased or decreased as needed (it's scaleable)
Ad hoc network	Created with a temporary device-to-device connection without the need for a connection to a Wi-Fi access point or router
VPN	A VPN will route your data traffic via the virtual server. This will hide/cloak your data from potential hackers
Mental well-being	Mental well-being describes your mental health, how well you cope with day-to-day life, how you feel, and how confident you are (good self-esteem).

The impact of Technology

Positive

- Apps can encourage physical activity
- Enhances access to learning
- Wearable technology can track heart rate
- Diabetics can track blood sugar levels and receive warnings if it is high or low, helping them to manage their well-being
- Allows flexibility in choosing a working style

Negative

- Can reduce sleep quality
- Eye strain/poor vision
- Repetitive strain injuries
- Physical inactivity can lead to weaker muscles
- Overuse can lead to: Loneliness, Depression, Anxiety

Traditional vs modern workplace

Traditional

- Takes time to travel to and from the workplace
- Formal work wear
- Desks/workstations
- Labour-intensive tasks
- Slow communication
- Sociable
- 9-to-5 hours

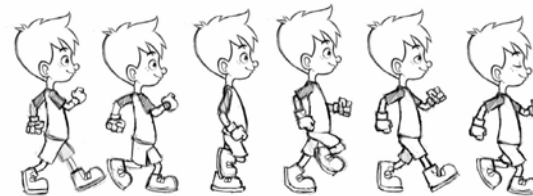
Modern

- Use of technology allows flexibility
- Teams can be local, national, or global
- Communication can be immediate
- Data/information is sent digitally and quickly
- Increased productivity
- Can be isolating

Computer Science Knowledge Organiser



BLENDER - MEDIA ANIMATIONS

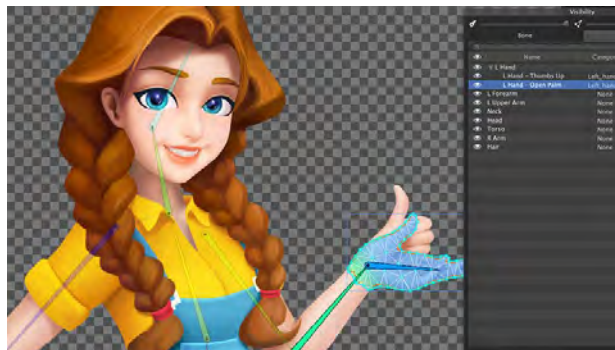


Stop motion - manually animate every frame of the animation e.g. Shaun the Sheep

- **slower to make animations**
- **More difficult to edit**

Keyframe animation - pick the important locations, the keyframes and the computer works out the rest (called tweening) e.g. Pixar films

- Faster to make animations
- Easier to edit
- Smoother animations
- Repeatable



Key words		
add	colour	cut
edge	knife tool	extrude
face	keyframe	focus
edit	vertex	location
loop	tweening	object
organic	proportional	rotate
render	ray tracing	scale
timeline	subdivision	mode



STOP MOTION ANIMATION

Definitions	
Face:	A surface made up of three or more sides. Faces are often referred to as polygons .
Vertex:	A point where one or more edges meet
Edge:	A line connecting two vertices
Objects:	Scenes are made up of geometric, control, lamp and camera objects
Keyframes:	Used for tracking change, a key is a marker in time
Ray tracing:	Rendering that involves tracing the path of a ray of light through the scene
Rendering:	The process of computationally generating a 2D image from 3D geometry
Subdivision:	Creating smooth higher poly surfaces which can take a low polygon mesh as input.
Proportional editing:	Transforming selected elements
Extrude:	Extend an object

Design and Technology:

Literacy / key words

CAD and CAM

Computer Aided Design (CAD)

drawing allows products to be manufactured using Computer Aided Manufacture (CAM) Computer aided manufacture is very fast and accurate and requires less human intervention

One-off production:

Making a single, unique product, often by hand, like a custom-made item or prototype.

Batch production: Making a set number of identical products in groups, like baking 50 cookies at once.

Mass production: Making thousands of identical products quickly using machines and assembly lines, like in a car factory.

CAD Computer Aided Design

This is using computer software to draw and model a product.

Examples:

2D Design, Photoshop, Macromedia Fireworks and Sketch Up

Advantages:

- Designs can be shared electronically
- Accurate
- Designs can be easily edited

Disadvantages:

- Software and training can be expensive
- Security issues

CAD Computer Aided Manufacture

This is using computer software to control machine tools to make products.

Examples:

Laser Cutter, 3D printer

Advantages:

- Faster
- Complicated shapes are easily produced
- Exact copied are easily made
- Machines can run 24/7

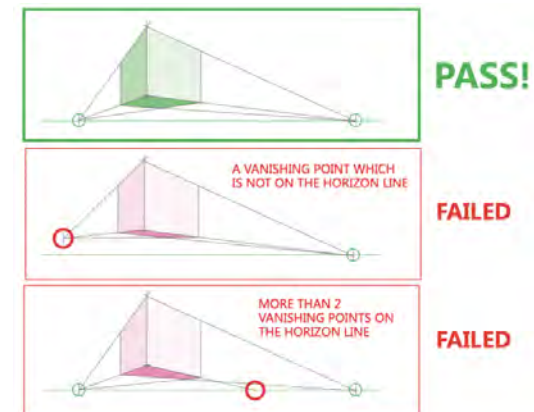
Disadvantages:

- High initial set up costs as CAM machines are expensive

Flow charts



2 point perspective



Extra - Read/watch/do

Watch and read

Who was Zaha Hadid

<https://www.bbc.co.uk/bitesize/articles/zd48239#zqt3g4p>



You will be assessed on

- Your knowledge of CAD CAM
- Your ability to write a specification
- Your completed product (cad and physical prototypes)

Make

select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture

Links to curriculum

Stage Configurations



Proscenium Arch
Audience sat on 1



Theatre in the Round
Audience sat on all side
of the stage



Promenade
Audience are led around a
space e.g. a park or a castle



Traverse
Audience sat on 2 sides,
facing each other



Thrust
Audience are sat on 3
sides

Roles & responsibilities of the theatre

- Set Designer
- Costume Designer
- Director
- Lighting Designer
- Sound Designer
- Performer
- Stage Manager
- Understudy
- Technician

Upstage right	Upstage Centre	Upstage left
Stage right	Centre stage	Stage left
Downstage right	Downstage centre	Downstage left
Audience		

DNA

Characters



Phil
Becomes leader.
Cold & manipulative.



Adam
Bullied by group.
Thought to be dead.



Cathy
Violent &
remorseless.



Leah
Moral & insecure.
Seeks Phil's attention.



Brian
Weak. Bullied
into the cover-up.



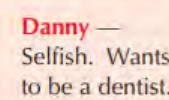
John Tate
First leader.
Lacks authority.



Richard
Reluctantly helps
with the cover-up.



Jan & Mark
Act as narrators.
Always together.



Danny —
Selfish. Wants
to be a dentist.

Lou — Follows
whoever is
in charge.

floodlight - a lantern with a wide beam that can cover a large area on stage, an effect called a wash

follow spot - a tight beam of light that can be used to highlight a particular area on stage, often used to highlight and follow a particular actor

Fresnel - a lantern that creates a soft beam of light

gel - a coloured filter that can be placed on a lantern in front of a beam of light to change the colour

gobo - a metal template positioned in front of a beam of light to create shapes of light on stage, eg a window frame or tree

Parcan - a type of lantern that produces an intense beam of light

practical - a light that is used as part of the set design, eg a desk lamp or torch

profile spot - a tight beam of light that can be used to highlight an area on stage

rigging - the structure that supports the lanterns, eg a lighting bar

strobe - a light that flashes quickly on and off to create the effect of slow motion on stage; a health and safety risk for people with certain health issues

DRAMA

Role Play – The act of pretending to be somebody else, of taking on a role. Thinking and acting differently to your ordinary self can help you empathise with a person and better understand an issue or theme.



Thought Tracking - when a character steps out of a scene to tell the audience how they're feeling. Sharing thoughts in this way provides deeper insight into the character for an audience.



Narrating - A spoken commentary about the action onstage. A narrator is like a storyteller informing the audience about the plot.



Cross-cutting/Split Focus - a device to move between two or more scenes staged in the space at the same time.



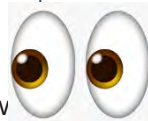
Tableau – A still image which communicates meaning. It can provide insight into character relationships with a clear focus upon use of space, levels, body language and facial expression.



Hot Seating - An actor sits in the hot-seat and is questioned in role, spontaneously answering questions they may not have considered before. Hot-seating helps an actor become more familiar with their role.



Marking the Moment – A way of highlighting the most important moment in a scene in order to draw the audience's attention to its significance. This can be done by using tableau, repetition, slow motion, narration, thought tracking, lighting and



Blood Brothers

Characters



Mrs Johnstone

The twin boys' mother. Loving. Very poor.



Mickey Johnstone

Friendly child. Grows up poor. Becomes unstable.



Linda

Practical & confident. Torn between twins.



Edward Lyons

Privileged upbringing. Kind, but naive.



Mrs Lyons

Adopts Edward. Manipulative. Protective.

The Narrator: A mysterious & unsympathetic figure.
Mr Lyons: Edward's adoptive father. Uncaring boss.

Sammy Johnstone: Mickey's brother. Naughty child. Turns to crime.
Chorus: Group that sings parts of story. Play minor characters too.

Context & Themes

Money & Social Class

Linked to power. Richer characters have choices in life — “talk of Oxbridge” for Edward.

Childhood & Growing Up

Childhood is a time of innocence & fun — “just a game”. Also linked to class — lower-class characters have to grow up faster.

Gender

Husbands / dads absent or lacking. Women have motherly roles, but also act as breadwinners.

Fate & Superstition

Events seem fated, e.g. we know the twins will die. Superstition influences characters (e.g. Mrs J).

Friendship

Presented as carefree and positive for children. More difficult in adulthood.

Identity

The twins show identity is rooted in upbringing / class — they are genetically identical but lead very different lives.

Plot — Key Events

Act One

- Mrs Johnstone gives away one of her twin babies to Mrs Lyons.
- The twins (age 7) meet and become “blood brothers”.
- The twins & Linda get in trouble with the police.
- The Lyonses move away & the Johnstones are moved too.

Act Two

- Mickey and Edward meet and become friends again.
- Linda gets pregnant and marries Mickey, who is also made redundant by Mr Lyons.
- Edward and Mickey fall out — they live different lives.
- Mickey is jailed for robbery, then becomes depressed.
- Mickey sees Edward and Linda together and goes to confront Edward. The boys find out they're related.

Mickey accidentally shoots Edward, and is killed by the police.



Subject- Specific Vocabulary

1	narrative perspective	(n) the point of view from which a story is told
2	parenthesis	(n) extra information added to a sentence, marked by commas, dashes or brackets
3	flashback	(n) a scene in a film, novel, story etc. set in a time earlier than the main story
4	symbolism	(n) when a writer takes an action, object, place, person, animal or word and gives it a much more metaphorical meaning
5	motif	(n) a dominant or repeating idea, image or word in an artistic work
6	biography	(n) an account of someone's life written by someone else
7	autobiography	(n) an account of a person's life written by that person
8	semi-autobiographical	(adj) dealing partly with the writer's own life but also containing fictional elements
9	prologue	(n) a piece of writing found at the beginning of a literary work, before the first chapter and separate from the main story

Character and Tone Vocabulary

10	insignificance	(n) being too small or unimportant to be worth consideration
11	unpalatable	(adj) an act or idea that is unpleasant or shocking and therefore difficult to accept

Thematic Vocabulary

12	relationship	(n) the way in which two or more people are connected, or the way they behave toward each other
13	hierarchy	(n) a system of ranking according to relative status or authority
14	homogenous	(adj) consisting of parts or elements which are all the same or alike
15	masculinity	(n) socially constructed expectations about how men should behave
16	sibling rivalry	(n) competition, jealousy or arguments between brothers and sisters
17	refugee	(n) someone who has been forced to flee their home because of war, violence or persecution
18	identity	(n) a person's personality or sense of who they are
19	liberty	(n) freedom from oppressive restrictions on one's way of life, behaviour or political views
20	empathy	(n) the ability to understand and share the feelings of another person
21	gender	(n) socially constructed perceptions of how men and women are expected to behave
22	gendered	(adj) reflecting or involving gender differences or stereotypical gender roles

Academic Vocabulary

23	stereotype	(n) a fixed and oversimplified belief about a group of people that ignores individual differences and can lead to unfair treatment or assumptions
----	-------------------	---





Subject- Specific Vocabulary

1	rhetorical device	a technique used in writing or speech to achieve a persuasive effect
2	ethos	(n) the appeal to credibility
3	logos	(n) the appeal to logic and reasoning
4	pathos	(n) the appeal to emotion
5	anecdote	(n) a short, interesting story about a real incident or person
6	anaphora	(n) the repetition of the same words at the start of successive sentences or clauses
7	modal verb	a verb that indicates likelihood, ability, permission or obligation
8	parallelism	two or more phrases or clauses in a sentence that have the same grammatical structure
9	colon :	punctuation used to introduce a quotation, list or powerful statement
10	semi- colon ;	punctuation used to link two closely related independent ideas, replace a conjunction, or separate phrases in a list
11	emotive language	words or phrases used to stir emotions in the audience
12	expert opinion	a belief or judgement about something given by an expert on a subject
13	cyclical structure	when a narrative or essay begins and ends with the same central idea, image or phrase

Thematic Vocabulary

14	reductive	(adj) considering or presenting something in an overly simple way
15	feminist	(n) a person who advocates for or supports equality for all genders
16	gender	(n) socially constructed perceptions of how men and women are expected to behave
17	patriarchy	(n) a society, family or system in which men have all or most of the power and importance
18	discrimination	(n) the act of treating people unfairly because of who they are (for example, their sex, beliefs or ethnicity)
19	socialisation	(n) the process of learning to behave in a way that is acceptable to society
20	internalise	(v) to make an attitude or behaviour part of one's nature by learning it, consciously or unconsciously
21	privilege	(n) a special advantage, immunity, permission, right, or benefit granted to or enjoyed by an individual or a group of individuals
22	representation	(n) including different types of people in literature, films, politics, sport, etc.
23	existential	(adj) relating to, or dealing with, existence
24	activism	(n) the act of campaigning to bring about political or social change

Academic Vocabulary

25	objective	(adj) based on real facts; not influenced by personal views or feelings
26	subjective	(adj) influenced or based on personal views or feelings rather than real facts
27	bias	(n) allowing your personal opinions to influence your judgment



Food Technology

Literacy / key words

Kosher: Prepared food that follows the requirement of Jewish dietary laws.

Halal: Slaughtered or prepared using a method that follows Islamic dietary laws.

Vegetarian: Someone who chooses to not eat any meat.

Lacto-ovo Vegetarian: someone who doesn't eat any meat or fish, but consumes milk, eggs and other animal products.

Vegan: Someone who doesn't eat any products derived from animals, e.g. meat, eggs and cheese.

Lacto-Vegetarian: Someone who doesn't eat any meat, fish or eggs, but consumes milk and other dairy products.

Ethical eating or food ethics: refers to the moral consequences of food choices.

Coeliac disease: where the digestive system is sensitive to gluten and can't digest it.

Gluten: a protein found in wheat flour, that makes dough stretchy.

Proteins: are made up of chemical 'building blocks' called amino acids.

Malnutrition: a physical condition resulting from either a faulty or inadequate diet or from a physical inability to absorb or metabolize nutrients.

Lactose Intolerance: a digestive problem where the body can't digest lactose (milk sugars).

Allergy: an immune system response to a certain substance (an allergen), e.g. fish, nuts or eggs.



What makes us choose?
Special Occasions
Culture
Likes and dislikes
Time of Day
Morals
Health Conditions



Type of vegetarian	Meat	Fish	Dairy	Eggs
Vegan	✗	✗	✗	✗
Pescetarian	✗	✓	✓	✓
Lacto	✗	✗	✓	✗
Lacto-ovo	✗	✗	✓	✓



Religious Beliefs

Hinduism: most avoid beef & related products; some vegetarians; some avoid eggs

Judaism: kosher; avoid pork & shellfish;

Islam: halal; avoid pork & related products; no alcohol

Buddhism: most are vegetarian or

Vegetarian alternatives to meat

Quorn: cultured fungus

Soya: soya bean

TVP: Textured vegetable protein

Tofu: soya bean curd

What is a Vegan diet	eat no animal flesh /meat/fish and poultry and no animal products
What is a lacto vegetarian diet	eat animal produce (Dairy) but not eggs or the flesh of animals/meat/fish/poultry
What is a lacto-ovo vegetarian diet	eat animal produce (Dairy and eggs) but not the flesh of animals/meat/fish/poultry
Why might someone choose to be a vegetarian?	Religious beliefs /Moral beliefs – cruel to kill animals/ Do not like the flavour, texture of meat / Land growing crops can feed many more people than land raising animals / Food scares – BSE, food poisoning, salmonella / Family influence/habits /Peer pressure
What foods can vegetarians get protein from?	Good vegetarian sources are Quorn, Tofu, Soya, Cereals, Pulses, Nuts & Lentils (some may also get this from dairy and eggs)
What foods can vegetarians get non-haem Iron from?	Found in pulses, nuts, dried fruit, dark green leafy veg, dark chocolate, cocoa powder, black treacle, curry powder.
What foods can vegetarians get Vitamin B12	Found in yeast extract, marmite and fortified breakfast cereals
Vitamin B12 is needed to:	Needed for energy production, formation of red cells

Extra - Read/watch/do

<https://www.youtube.com/watch?v=D6eor1wkNFY>



You will be assessed on: Factors influencing food choices; Health Conditions and Fat; Macro-nutrients, energy and nutritional analysis; Life stages and nutritional needs; Food Science investigation Starch and sugars; Nutritional analysis of one dish.

Links to curriculum: Recognise the factors influencing food choice, including such as preference, ethical belief, availability, season, need, cost, packaging, food provenance, culture, religion, allergy/intolerance, advertising, body image and peer pressure;

Diet Related Health conditions

Cardiovascular Disease (CVD)

This is the general term that describes disease of the heart or its blood vessels. The term includes coronary heart disease and stroke in which arteries carrying blood around the body become blocked with fatty deposits (cholesterol) and consequently blood flow is reduced. CVD is linked to poor diet and lifestyle traits such as obesity, high blood pressure, a diet high in cholesterol and lack of exercise.

To reduce the outcome of CVD it is important to follow dietary guidelines and eat a diet that is low in saturated fat and instead eat foods higher in unsaturated fat such as oily fish, nuts and

Diabetes: Type 2

The body may produce too little insulin, or the body has become insulin resistant and cannot utilise the glucose produced by carbohydrates. To help prevent this condition, people should follow the healthy eating guidelines, exercise and maintain a healthy weight. This kind of diabetes usually affects people who are overweight or older. If a person is overweight, they are twice as likely to get type 2 diabetes. Therefore, a high-sugar diet and high-fat diet should be avoided.

Iron Deficiency Anaemia

Iron is important in making red blood cells, which carry oxygen around the body. Iron deficiency anaemia results in the person affected feeling tired and lethargic because organs and tissues will not get as much oxygen as they need.

Good sources of iron include liver (avoid during pregnancy), eggs, red meat and dried fruit e.g. dried apricots and most dark green leafy vegetables.

Obesity

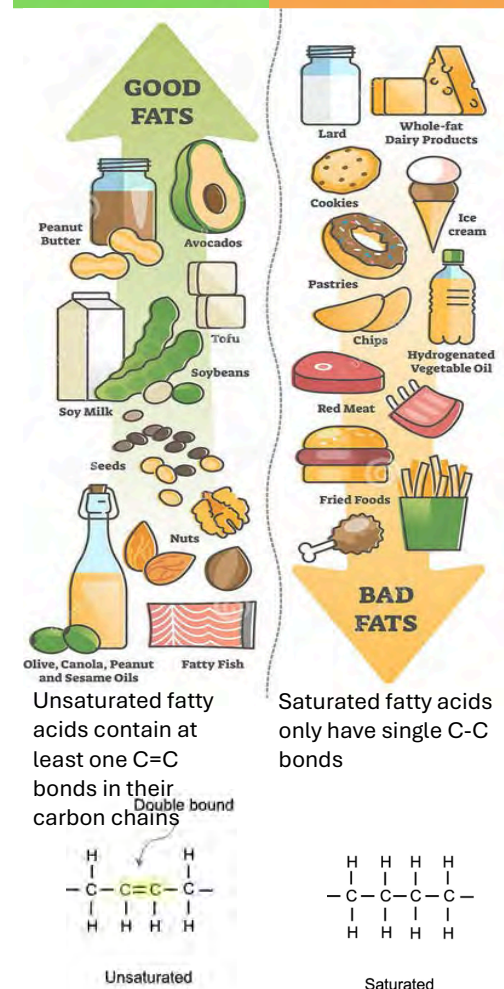
This is the term to describe a person who is very overweight, with a lot of body fat. It is a common problem in Western society. The method to determine if a person is overweight is to measure their BMI.



Nutrient Needs for Teenagers

Nutrient	Reason	Examples of Foods
Protein	Cope with growth spurts. Boys muscular tissue development.	Omelettes chicken
Iron	Girls loose iron during menstruation and could become anaemic if not replaced. Vitamin C helps absorb iron	Spinach, beef
Vitamin C		Peppers, strawberries
Calcium	Skeleton grows rapidly. These nutrients help reach peak size and bone density	Milk, yogurt, kale, tofu
Vitamin D		Tuna, Salmon, Mackerel

Unsaturated Fat	Saturated Fat
Avocados, nuts, seeds, olives, natural nut butters, plant oils	Meat, dairy products, eggs, coconut oil, palm oil
Liquid at room temperature	Solid at room temperature
Lowers LDL cholesterol and raises HDL cholesterol	Raises LDL cholesterol and TAG levels
Decreases insulin resistance	Increases insulin resistance



Key Terms

BMR: Basal Metabolic Rate is the amount of energy we need to keep our body alive. Energy balance: the amount of energy we get from food each day is the same as the amount of energy we use each day.

BMI: This is a measure that adults and children can use to see if they are a healthy weight for their height.

Energy Dense: foods containing high amounts of fat and carbohydrates (especially sugar) e.g. pizza, pastry, chocolate bars, pastries, cakes, cookies, meat products i.e. sausages, burgers).

Kilocalorie (kcal)/kilojoule (Kj): units used to measure energy.

PAL: (Physical Activity Level): the amount of energy we use for movement and physical activity every day.

Functions in the body:

Everyone needs energy to survive. It allows the body to:

- Move muscles and be physically active
- Produce heat to keep warm
- Send messages to the brain to make nerves work
- Allow the body to grow and develop

Sources:

Carbohydrate: foods containing sugar and starch

(1g of carbohydrates = 3.75 / 4 kcals of energy)

Fat: foods containing visible and invisible fats and oils.

(1g of fat = 9 kcals of energy)

Protein: (1g of protein = 4 kcals of energy)

Physical Activity Level: Regular exercise is an important part of a healthy lifestyle.

Physical activity :

- Reduces risk of developing heart disease, obesity and some cancers.
- Improves health of muscles and skeleton
- Keeps the brain alert and working
- Makes people feel good about themselves.
- Health experts are concerned about the sedentary (inactive) lifestyles due to too much sitting for long periods of time e.g. working at a desk, watching television, using the internet or playing computer games.

The recommended physical activity needed daily is suggested to be:

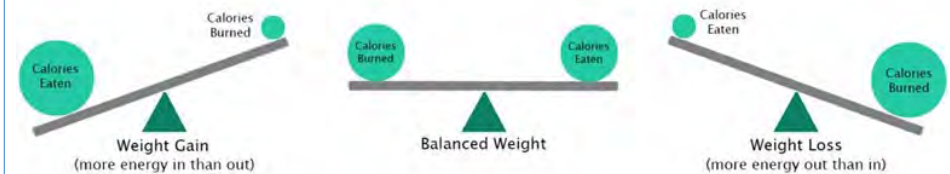
- 5-18 years: aim for an average of at least 60 minutes of moderate intensity physical activity a day across the week
- 19-64 years: aim to do at least 150 minutes of moderate intensity activity a week or 75 minutes of vigorous intensity activity a week.

Amount of energy needed daily by each nutrient: Carbohydrate: 50%. Most of which should come from starch, intrinsic and milk sugars.

No more than 5% of the energy from carbohydrate should come from free sugars, intrinsic sugar found in fruit and vegetables.

Fat: 35% or less eat less saturated fats.

Protein: 15%



Energy Balance: The amount of energy we take in from food must be used up by our Basal Metabolic Rate and Physical Activity Level.

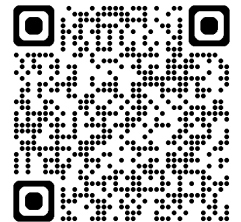
If we take in more energy from the food we use every day, the energy we do not use will be stored as fat and the body will gain weight.

If we take in less energy from food than we use every day, the energy stored in body fat will need to be used and the body will gradually lose weight.

This is the basis of weight reducing diets.



<https://www.youtube.com/watch?v=D6e0r1wkNfY>



Literacy / key words

Gelatinisation: When starch particles swell and burst, thickening a liquid.

Viscosity: a measure of a food's resistance to flow, indicating how thick or thin it is.

Consistency: refers to the texture and form of food, which can range from liquid to solid.

Dextrinization: occurs when starch is exposed to dry heat. Starch in bread, biscuits and cakes with dry heat (toasting/baking) causes the starch molecules to break down to dextrin (brown colour)

Caramelisation: Sugar molecules break down when they reach a high temperature causing the sugar to turn brown and change flavour.

Roux: a sauce base made from plain flour and melted butter.

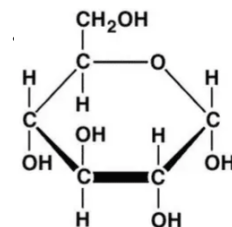
Carbohydrates: are sugar molecules. Along with proteins and fats, carbohydrates are one of three main nutrients found in foods and drinks. Your body breaks down carbohydrates into glucose. Sugars, starches and dietary fibre are carbohydrates.

Glucose: or blood sugar, is the main source of energy for your body's cells, tissues, and organs.

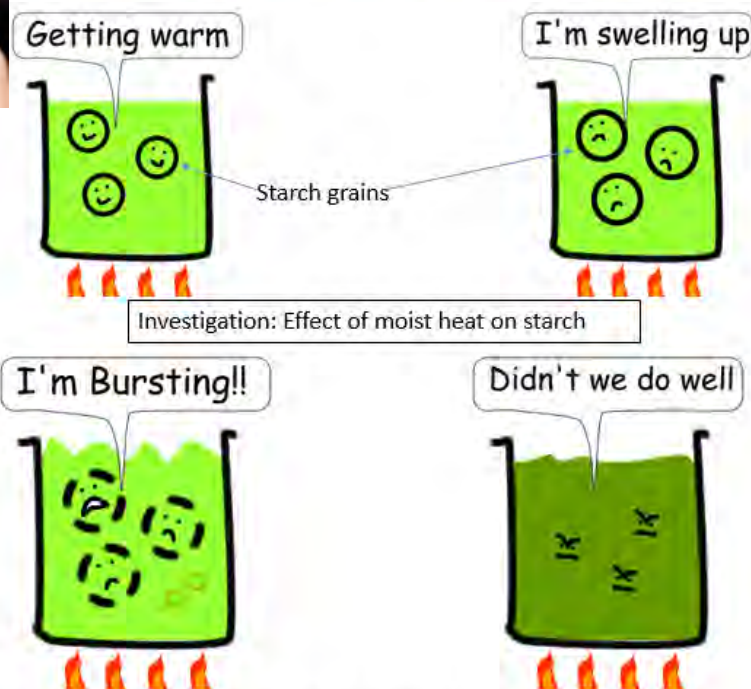
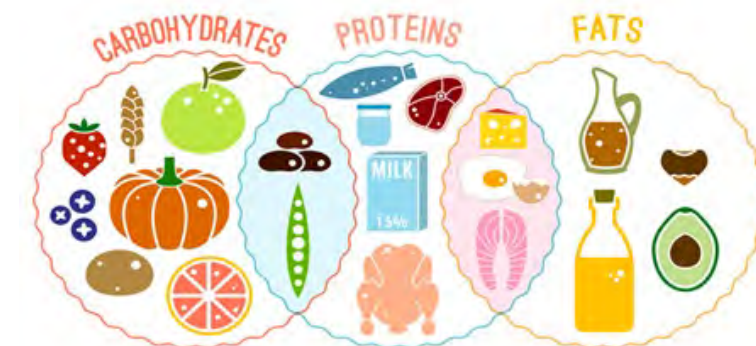
Sugars:

- Monosaccharide are the simplest form of carbohydrate and can't be broken down.
- Disaccharide is the sugar formed when two monosaccharides are joined by glycosidic linkage.
- Polysaccharides are macromolecules made up of more than ten monosaccharides joined by

glycosidic bonds.

**Dextrinization****Chemical formula for**

Gelatinisation:
making a Roux
Sauce



Gelatinisation occurs when the starch grains absorb water and ruptures to thicken a sauce or in the cooking of rice and pasta.

Key terms / Literacy:

Tectonic plate – large portions of the Earth's crust that have been broken up at plate margins.

Mantle – the thickest part of the Earth's structure below the crust. It is made up of molten rock and its temperature ranges between 500°C-4,000°C

Crust – The outermost layer of the Earth. It is broken into tectonic plates. These can be made of oceanic crust, which is old and dense, or continental crust, which is newer and less dense.

Magma – molten rock found beneath the Earth's surface.

Lava – molten rock found on the Earth's surface.

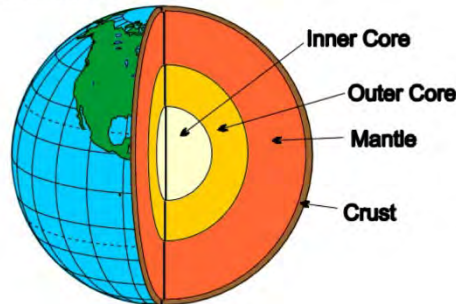
Subduction – when one tectonic plate sinks beneath another.

Primary effects – impacts that are a direct result of the hazard.

Secondary effects – impacts that may occur after the hazard, often caused by the primary effects.

Immediate responses – actions taken to reduce the effects of the hazard – minutes or hours afterwards.

Long term responses – actions taken to reduce the effects of the hazard – days/months/years afterwards.

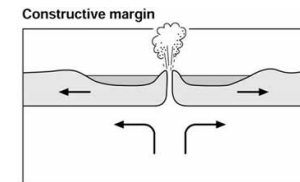
Structure of the EarthHow has the Earth changed over time?

The theory of continental drift says that long ago, all the continents were one big landmass called Pangaea. Over millions of years, they slowly moved apart to become the separate continents we see today. This idea is supported by how the coastlines of South America and Africa fit together like puzzle pieces and by finding similar rocks and fossils on different continents.

Why do tectonic plates move?

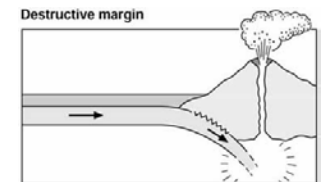
Ridge push – at constructive plate boundaries, where the plates are being pushed up by rising magma, a ridge is created. Gravity acts on the ridge, causing the plates to move downwards and away from each other.

Slab pull – At destructive plate boundaries, oceanic crust which is denser, sinks into the mantle as it is pulled down by gravity into the mantle, and the rest of the plate is pulled

Tectonic plates

Plates move apart, creating new crust. Magma rises to the surface, leading to volcanic eruptions and earthquakes as the crust fractures and shifts.

Plates collide, causing subduction and destruction of crust. Intense pressure builds up, resulting in explosive volcanic eruptions, powerful earthquakes, and potentially tsunamis.



Plates slide past each other horizontally. Friction between the plates builds up, releasing energy in the form of frequent earthquakes, while no new crust is formed and no volcanic activity occurs.

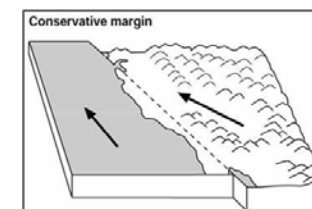
**ridge push**

plate pushed by the weight of a mid-ocean ridge

**slab pull**

plate pulled by the weight of its cold, dense subducting section



Case Study: Hunga Tonga Volcano

The Hunga Tonga eruption of **2022** was a significant volcanic event that occurred in the South Pacific. On **January 15**, a submarine volcano located near the island of Hunga Tonga-Hunga Ha'apai erupted explosively, sending plumes of ash, steam, and gas high into the atmosphere.

The eruption had significant effects:

- According to a World Bank impact report, the event has caused \$90.4 million in economic damage.
- Waves reaching up to 15 metres hit the outer Ha'apia island group, in Tonga's main island, Tongatapu, 56 houses were destroyed or seriously damaged.
- According to the government, at least three people lost their lives in Tonga. Two people drowned off a beach in Peru after unusually high waves were recorded there.
- Ash damaged crops, especially bananas, tomatoes, pineapples and watermelon crops which impacted food supplies and their ability to earn money from selling them.

And required the following responses:

- The Fijian government issued a tsunami warning, telling people in coastal parts to move to higher ground due to "larger than usual waves".
- The Australian defence force sent a surveillance plane on Monday 17th January 2022 to assess damage to critical infrastructure such as roads, ports and power lines.
- After the ash descended on Tonga, young men from villages surrounding the capital travelled to the airport to clear the runways by hand.
- The World Bank provided \$8 million to Tonga following the eruption

Why do people live at risk from tectonic hazards?

- Volcanic rock and ash provide fertile land which results in a higher crop yield for farmers.
- Tourists are attracted to the volcano, which increases money to the local economy.
- Geothermal energy can be harnessed, which provides cheaper electricity for locals.
- Minerals are contained in lava, e.g. diamonds - these can be mined to make money.

The risk of tectonic hazards DOES NOT automatically mean a place is cheaper to live. Think of Los Angeles - which often experiences earthquakes, but is very expensive.

**Extra: Read / Watch / Do:**

Do: Create a 3D model of an earthquake-proof building and justify its features.

Read: Read news articles about a recent tectonic event. What happened and how did people respond?

Watch a film about a tectonic event e.g. Dante's Peak – can you find any flaws in the representation of geographical processes?

Curriculum Links:

The content from this unit ties in with the Hazards unit that we study at GCSE. It also builds on prior knowledge about rocks from Y7, impacts and responses from weather hazards, as well as causes of poverty which is

Assessment Skill - Writing to analyse:

Explain the importance of one thing over another, or make a decision based on an issue. You should:

1. Make an opening statement to set out your key decision, e.g. the secondary effects of the volcano were worse than the primary effects.
2. Give evidence for your argument e.g. the cost of the damage was \$90.4mill, but only a few people died.
3. Explain thoroughly how this evidence proves your point e.g. the costs were bad because... Therefore... As a result...
4. Give evidence and an explanation that opposed your argument e.g. some people would argue that the primary effects were worse because... Therefore... As a result...
5. Conclude to give the main reason why you came to your final decision e.g. The main reasons the secondary effects were worse is because it had a long-lasting damage to the lives of many people who were living close to the eruption.

Writing to **evaluate**: weigh up the advantages and disadvantages equally, then conclude.

Key terms / Literacy:

Development – the progress of a country in terms of economic growth, use of technology and human welfare.

High Income Country (HIC) – a richer country with a GNI per capita of \$13,205 or above.

Low Income Country (LIC) – a poorer country with a GNI per capita of \$1,085 or below.

Newly Emerging Economy (NEE) – countries that are experiencing higher rates of economic development which is pulling them out of the category of LIC.

Aid - assistance given from one country to another. It includes money, equipment, training and loans. It can be foreign aid from the government of one country to another - or from charities to a country or region

Gross National Income (GNI) per capita -

GNI per capita is the total value of all the goods and services produced in a country in a year plus income from abroad, divided by the number of people (per capita) living in that country.

Human Development Index (HDI)

This is a development indicator made up of a number of social and economic measures - GNI per capita, number of years of education and life expectancy. HDI values can range from 0 (less developed) to 1 (more developed).

What is development and why is it important?

Development is a measure of how advanced a country is socially, economically, or technologically. And countries around the world are at different stages of development.

Development must be equitable, viable and bearable to be considered **sustainable development**. This means it satisfies social, economic and environmental needs.

How can we measure development?

There is no single way to measure how developed a country is. However, development indicators can give some idea of a country's development.

- Gross National Income (GNI) per capita is useful when measuring the wealth of a country and deciding if a country is a HIC or LIC. Richer countries are often thought to be better developed, but if a country does not use their wealth to support their population, this will not be the case.
- Literacy rates are useful in understanding how good the social development of a country is. It tells us about the level of education within a country. Children who learn to read and write are more likely to get jobs when they are older. However, a country may be an NEE that has invested a lot of money into education, but not into other things such as healthcare, which could be damaging society in other ways.
- Birth rates may be affected by religious and cultural factors rather than economics or development.
- HDI is thought to be the most useful indicator because it combines three other indicators and includes both social and economic measures.

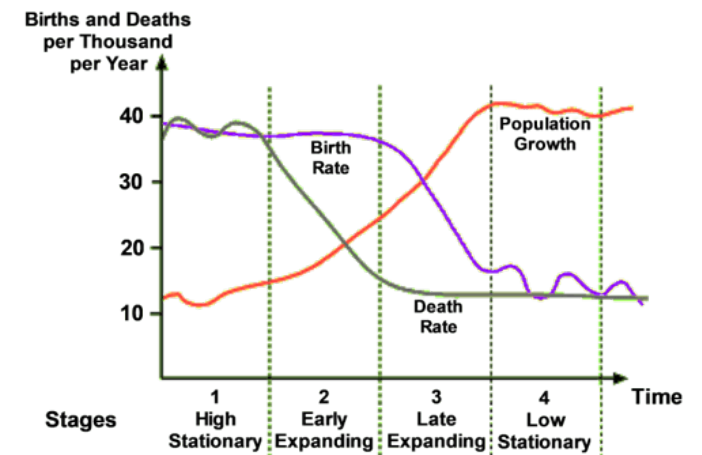
How is population affected by development?

The Demographic Transition Model shows how the birth rate, death rate and overall size of the population may change as a country becomes more developed.

It shows that as development improves over time, death rate falls as health and diet improves. Birth rates then fall, again as health improves, but also due to cultural factors changing and because women are more likely to work and so they will have less time to look after children. These factors also support the development of a country as there are more people working so wealth increases.

When birth rates are higher than death rates the population increases.

Not all countries follow the model due to cultural differences. It also does not consider population changes due to migration

Demographic Transition Model

Why are some countries poorer than others?

Physical Factors: Some countries are poor because their climate prevent economic development. Droughts, poor soils or extreme temperatures can reduce how many crops are grown. Certain temperatures can also increase the spread of diseases such as malaria or tropical illnesses.

Historical Factors: Colonisation can also have long lasting impacts on poverty in some countries. Colonising powers often extracted valuable resources from colonised countries, depleting their natural sources. Colonized countries were often structured to serve the economic interests of the colonisers, with limited local industries and markets. This led to these countries depending on selling to their former colonisers to make money.

Economic Factors: When GNI is low the country will have a low income from tax revenues. This leads to less money to invest in infrastructure, healthcare and education, which leads to low-level jobs continuing to be the main source of income.

Extra: Read / Watch / Do:

- Do: Research an aid agency and consider how you could support them, either now, or when you are older.
- Read: *Factfulness* by Hans Rosling
- Watch: *Don't Panic – The Truth About Population* on YouTube.

Assessment Skill - Writing to analyse:

Explain the importance of one thing over another, or make a decision based on an issue. You should:

1. Make an opening statement to set out your key decision, e.g. the main factor determining development is historical factors.
2. Give evidence for your argument e.g. Events such as colonisation and war have held back the development of nations for over 100 years, for example many African nations which were colonised by Britain and France and are still some of the poorest nations in the world today.
3. Explain thoroughly how this evidence proves your point e.g. This is because... Therefore... As a result...
4. Give evidence and an explanation that opposed your argument e.g. Some people may feel that physical factors have a greater influence on development, such as... because... Therefore... As a result...
5. Conclude to give the main reason why you came to your final decision.

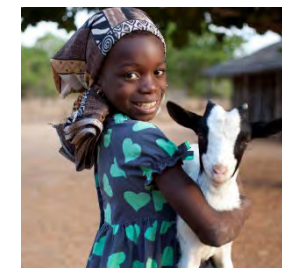
Writing to **evaluate**: weigh up the advantages and disadvantages equally, then conclude.

How do aid projects help a country to develop?

Example: Goat Aid

Background: Goats are given by the charity Oxfam to families and villages in countries such as Burundi or Malawi.

Advantages	Disadvantages
- Goat milk and meat can be used as a food source. - Brings village together as they look after the goats. - Goats breed which makes the strategy sustainable. - Manure can be used to fertilise crops. - Milk and babies can be sold to make an income.	- Family needs to provide shelter and food for the goat. - Families may need training how to look after the goat properly. - Veterinary care may be expensive and hard to find. - The income gained from the goats will only be small.

**Curriculum Links:**

The content from this unit is important throughout most units of work in geography, because many human structures depend on the level of development in a place.

At GCSE we will study the theory behind economics, the economy of Nigeria and the economy of the UK.

Topic 1 – World War One

Key Vocabulary:

Word	Definition
Alliance	An agreement between countries to support each other.
Militarism	Building up armed forces and preparing for war.
Nationalism	Pride in and loyalty to your nation, often believing it is superior.
Imperialism	Countries competing to build empires and gain territory.
Assassination	The murder of an important political figure.
Conscription	Compulsory military service.
Propaganda	Information used to persuade people to support a cause.
Trench Warfare	Fighting from deep ditches dug into the ground.
Total War	When the whole country and economy are involved in the war effort.
Armistice	An agreement to stop fighting.
Treaty	A formal agreement between countries.
Reparations	Payments made by a defeated country for damage caused during war.

WORLD WAR ONE (1914–1918) – KEY KNOWLEDGE

LONG-TERM CAUSES: MAIN

M MILITARISM

- Britain and Germany built large navies.
- European powers increased the size of their armies.

A ALLIANCES

- Triple Alliance: Germany, Austria-Hungary, Italy.
- Triple Entente: Britain, France, Russia.

TRIPLE ALLIANCE

TRIPLE ENTENTE

I IMPERIALISM

- Countries competed for colonies and global power.

N NATIONALISM

- Many people believed their nation was superior.
- Nationalist tensions were especially strong in the Balkans.

THE BALKANS

SHORT-TERM CAUSE

28 JUNE 1914 Archduke Franz Ferdinand of Austria-Hungary was assassinated in Sarajevo by Gavrilo Princip.

Following a series of alliance commitments and ultimatums:

- Austria-Hungary declared war on Serbia.
- Russia supported Serbia.
- Germany supported Austria-Hungary.
- Britain joined after Germany invaded Belgium.

WHY DID MANY WELCOME WAR?

Many believed:

- The war would be over quickly ("Home by Christmas").
- Fighting was patriotic and honourable.
- War would solve international tensions.
- Propaganda encouraged support for war.

WHY WERE MEN FORCED TO FIGHT?

VOLUNTEERING 1914–1915:

- Over 2 million men volunteered.

CONSCRIPTION 1916:

- Military Service Act introduced conscription.
- Single men first.
- Later extended to married men.

REASONS:

- Huge casualties.
- Need for more soldiers.

TOTAL WAR

Total war meant the whole country became involved.

AT THE FRONT

- Trench warfare.
- New weapons: machine guns, tanks, poison gas, aircraft.

AT HOME

- Women entered workplaces.
- Food shortages led to rationing.
- Government controlled industries.
- Propaganda encouraged support.

CONSEQUENCES OF WWI

CHANGES TO THE WORLD

- Around 10 million soldiers died.
- German, Russian, Ottoman and Austrian Empires collapsed.
- New countries were created.
- League of Nations established.

CHANGES TO BRITAIN

- Greater government involvement in everyday life.
- Expanded role of women in work.
- Economic difficulties after the war.
- Political pressure for wider voting rights.

Topic 2 – Suffrage and Popular Protest

Key Vocabulary:

Word	Definition
Suffrage	The right to vote.
Franchise	The right to vote in elections.
Reform	A change made to improve a system.
Democracy	Government where people help choose leaders through voting.
Protest	Action taken to bring about change.
Chartist	Member of a movement campaigning for political reform in the 1830s-40s.
Suffragist	Campaigner who used peaceful methods to gain votes for women.
Suffragette	Campaigner who used militant tactics to gain votes for women.
Militant	Using direct and sometimes aggressive action.
Representation	Having a voice in government through elected representatives.
Equality	Having the same rights and opportunities.
Interpretation	An explanation of the past based on evidence.

WHAT DID THE VOTING SYSTEM LOOK LIKE IN 1832?



BEFORE REFORM: 1832



Only a small number of wealthy men could vote.



Most working-class men could not vote.



Women could not vote.

ROTTEN BOROUGHES



Some constituencies were "rotten" boroughs" with very few voters.

1832 REFORM ACT



- Increased the number of men who could vote.
- Still excluded most working-class men and all women.

WHY WAS A MALE SUFFRAGE CAMPAIGN NEEDED? THE CHARTISTS (1838–1848)



The People's Charter demanded:

- Votes for all adult men.
- Secret ballots.
- Equal electoral districts.
- No property qualification for MPs.
- Payment for MPs.
- Annual elections.



Although Chartism failed in the short term, most of its demands were later achieved.

GROWTH OF MALE SUFFRAGE: REFORM ACTS



More urban working-class men gained the vote.



More rural working-class men gained the vote.



By the late nineteenth century, many more men could vote than in 1832.

SUFFRAGISTS

National Union of Women's Suffrage Societies (NUWSS)

Leader: Millicent Fawcett

Methods:

- Petitions
- Meetings
- Lobbying MPs
- Peaceful campaigning

Successes:

- Built public support.
- Increased awareness of women's voting rights.

Limitations:

- Progress was slow.



SUFFRAGETTES

Women's Social and Political Union (WSPU)

Leader: Emmeline Pankhurst

Methods:

- Demonstrations
- Window-smashing
- Hunger strikes
- Civil disobedience

Successes:

- Gained publicity.
- Forced politicians to discuss women's suffrage.

Limitations:

- Some people were alienated by militancy.



DID WWI LEAD TO WOMEN'S SUFFRAGE?

ARGUMENT: WWI WAS IMPORTANT



- Women worked in factories and services.
- Women demonstrated responsibility and contribution to society.
- Attitudes towards women began to change.



ARGUMENT: SUFFRAGE CAMPAIGNS WERE MOST IMPORTANT



- Campaigning had been taking place for decades.
- Suffragists and Suffragettes kept the issue in public view.
- Some historians argue votes for women were already becoming likely.

Extra - Read/watch/do

Causes of WWII:

<https://www.bbc.co.uk/bitesize/articles/zgtmm39>

What is fascism?

<https://www.youtube.com/watch?v=4ejvegGwXYs>

You will be assessed on

The political spectrum, the rise of fascism in Italy, Germany and Britain

The Treaty of Versailles, turning points on the road to WWII

Links to curriculum

RE

English

Geography

KPI 9.01 Decimals Manipulation

1) Multiplying decimals	1) Remove the decimal points. 2) Multiply. 3) Insert the same number of decimal points in the answer as in the question. $\begin{array}{r} 0.5 \times 0.3 \\ 5 \times 3 = 15 \\ 0.5 \times 0.3 = 0.15 \end{array}$	2) Dividing a decimal by an integer $\begin{array}{r} 0.72 \div 6 \\ 0.12 \\ 6 \overline{) 0.72} \end{array}$	$\begin{array}{r} 0.972 \div 8 \\ 0.1215 \\ 8 \overline{) 0.9720} \end{array}$
		3) Dividing an integer by a decimal 1) Write as a fraction. 2) Form an equivalent fraction. 3) Divide.	

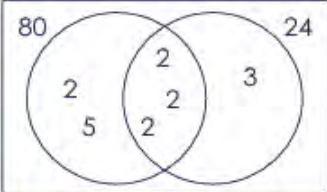
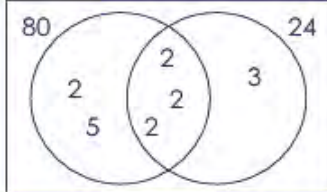
KPI 9.02 Estimation and Limits of Accuracy

1) $\approx$	"approximately equal to"	2) Truncation	Ignoring all decimal places past a certain point without rounding.
3) Significant figures	The total number of digits in a number, not counting the zeros at the beginning of a number or at the end of a decimal number. 345 000 has 6 significant figures. 0.3047 has 4 significant figures.	4) Estimate	Find approximate answer by calculating with numbers rounded to one significant figure.
5) Error Intervals	The range of values (between the upper and lower bounds) in which the precise value could be. least possible value $\leq x <$ greatest possible value		

KPI 9.03 Related Calculations

$19 \times 18 = 342$ $19 \times 180 = 3420$ $190 \times 18 = 3420$ $190 \times 180 = 34200$ $1900 \times 180 = 342000$	$108 \div 9 = 12$ $1080 \div 9 = 120$ $108 \div 90 = 1.2$ $108 \div 0.9 = 120$ $108 \div 0.09 = 1200$
--	---

KPI 9.04 HCF and LCM of Large Numbers

1) Prime numbers	A prime number has two distinct factors; 1 and itself. 2 is the only even prime number. 1 is not a prime number. The first ten prime numbers are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29		
2) Factor	Any whole number that divides exactly into another number leaving no remainder. Factors of 20 are: 1, 2, 4, 5, 10, 20	3) Multiple	The result of multiplying a number with a whole number. (times tables!) The multiples of 7: 7, 14, 21, 28, 35, 42, 49, 56, 63, 70 ...
4) HCF-Venn diagram	 HCF of 80 and 24 = $2 \times 2 \times 2 = 8$	5) LCM-Venn diagram	 LCM of 80 and 24 = $2 \times 2 \times 2 \times 2 \times 3 \times 5 = 240$

KPI 9.05 Fraction Calculations

1) Writing one number as a fraction of another	Write £15 as a fraction of £25. $\frac{15}{25} = \frac{3}{5}$	2) Reciprocal	Reciprocal of 7 $\rightarrow \frac{1}{7}$ Reciprocal of $\frac{2}{3} \rightarrow \frac{3}{2}$
3) Fractions of an amount	Divide the amount by the denominator and then multiply the result by the numerator.		
4) Add/Subtract fractions	Make the denominators the same (find the LCM). Use equivalent fractions to change each fraction to the common denominator. Add/subtract the numerators only.	$\frac{2}{7} + \frac{2}{5} = \frac{10}{35} + \frac{14}{35} = \frac{24}{35}$	
5) Multiplying fractions	Multiply the numerators. Multiply the denominators. Simplify where possible.	$\frac{4}{5} \times \frac{3}{8} = \frac{12}{40} = \frac{3}{10}$	
6) Dividing fractions	Keep the first fraction the same. Change the second to its reciprocal. Multiply the fractions. Simplify/convert to mixed number where possible.	$\frac{4}{5} \div \frac{3}{8} = \frac{4}{5} \times \frac{8}{3} = \frac{32}{15} = 2\frac{2}{15}$	

KPI 9.06 Algebraic Manipulation

1) $2a$	$2 \times a$	2) ab	$a \times b$
3) a^2	$a \times a$	4) $3a^2$	$3 \times a \times a$
5) a subtracted from b	$b - a$	6) a less than b	$b - a$
7) a divided by b	$\frac{a}{b}$	8) b divided by a	$\frac{b}{a}$
9) 4 times smaller than a	$\frac{a}{4}$ or $a \div 4$	10) 4 times larger than a	$4 \times a \rightarrow 4a$
11) 5 th power of a	a^5	12) Variable	A letter used to represent any number.
13) Coefficient	The number to the left of the variable. This is the value that we multiply the variable by. $4x \rightarrow$ The coefficient of x is 4. $x \rightarrow$ The coefficient of x is 1.	14) Term	A single number, variable or numbers and variables multiplied together.
15) Simplifying	An expression can be simplified by grouping like terms. E.g. $2a + b^2 - 4b + 7a = 9a + b^2 - 4b$	16) Identity	An identity is an equation which is always true no matter what value of the unknown is substituted. E.g. $3x - 15 = 3(x - 5)$

KPI 9.07 Index Laws

1) Multiplication law	$a^m \times a^n = a^{m+n}$ Same base numbers, ADD the powers.	2) Division law	$a^m \div a^n = a^{m-n}$ Same base numbers, SUBTRACT the powers.
3) Power to a power	$(a^m)^n = a^{m \times n}$ MULTIPLY the powers.	4) Raising a fraction by a power	$(ab)^n = a^n \times b^n$ Raise each number or variable to the same power.
5) Power of 0	$a^0 = 1$. Any number or variable to the power of zero equals 1.	6) Negative powers (integers)	$a^{-1} = \frac{1}{a}$ $a^{-2} = \frac{1}{a^2}$ $a^{-n} = \frac{1}{a^n}$ A negative power represents the reciprocal.
7) Positive unit fractions	$a^{\frac{1}{2}} = \sqrt{a}$ $a^{\frac{1}{3}} = \sqrt[3]{a}$ $a^{\frac{1}{n}} = \sqrt[n]{a}$	8) Negative unit fractions	$a^{-\frac{1}{2}} = \frac{1}{\sqrt{a}}$ $a^{-\frac{1}{3}} = \frac{1}{\sqrt[3]{a}}$ $a^{-\frac{1}{n}} = \frac{1}{\sqrt[n]{a}}$
9) Positive non-unit fractions	$a^{\frac{m}{n}} = (\sqrt[n]{a})^m$	10) Negative non-unit fractions	$(a)^{-\frac{m}{n}} = \left(\frac{1}{a}\right)^{\frac{m}{n}} = \left(\sqrt[n]{\frac{1}{a}}\right)^m$

9.08 Standard Form

1) Rule	Numbers written in standard form are always written in the form $a \times 10^n$, where $0 < a < 10$	2) Powers of 10	$10^1 = 10$ $10^2 = 100$ $10^3 = 1000$ $10^3 = 10\ 000$ $10^4 = 100\ 000$ etc.	$10^{-1} = \frac{1}{10} = 0.1$ $10^{-2} = \frac{1}{100} = 0.01$ $10^{-3} = \frac{1}{1000} = 0.001$ $10^{-4} = \frac{1}{10000} = 0.0001$ etc
3) Ordinary to Standard Form	$340000 = 3.4 \times 10^5$ $0.00903 = 9.03 \times 10^{-3}$	4) Standard Form to Ordinary	$1.09 \times 10^3 = 1090$ $8.77 \times 10^{-4} = 0.0000877$	

KPI 9.09 Expanding and Factorising 2

1) Expand	Multiply out the bracket(s) in the expression. E.g. $3(5x + 7) = 15x + 21$	2) Factorise	Identify the HCF and rewrite the expression with brackets. E.g. $6x^2 + 9x = 3x(2x+3)$.									
3) Expanding double brackets	Writing two brackets next to each other means the brackets need to be multiplied together. $(x + 1)(x + 2) = (x + 1) \times (x + 2) = x^2 + 3x + 2$ Note: $(x + a)^2 = (x + a)(x + a)$	<table><tr><td>x</td><td>x</td><td>+1</td></tr><tr><td>x</td><td>x^2</td><td>+x</td></tr><tr><td>+2</td><td>+2x</td><td>+2</td></tr></table>		x	x	+1	x	x^2	+x	+2	+2x	+2
x	x			+1								
x	x^2	+x										
+2	+2x	+2										
4) Factorising quadratics	To factorise a quadratic, put it back into a pair of brackets. To find the terms that go in each bracket, look for a pair of numbers which multiply to give the constant and add together to give the coefficient of x											
5) Difference of two squares (DOTS)	$a^2 - b^2 = (a+b)(a - b)$	E.g. $x^2 - 16 = (x + 4)(x - 4)$										



Year 9 Autumn Term

Musical features of Reggae

- **Offbeat rhythms (back beat)**
- **Syncopated rhythms**
- **Verse-chorus song form**
- **Lead singer and backing singers using 'Call and Response'**
- **Reggae band backing: brass instruments, saxophones, electric guitars, bass guitar, keyboards, drums and percussion instruments**
- **Use of improvisation**
- **Slow, relaxed 'chilled' tempo in a 4/4 time signature**
- **Simple harmonies**

KEY WORDS – test yourself! (definitions on the next page)

Mento Ska Rock Steady Rastafarian Syncopation Offbeat Lyrics Riffs Strong beats/ Weak beat Call and Response Triad Tonic/ Dominant/ Subdominant

Reggae is one of the most traditional musical styles from Jamaica, first heard in the UK in the 1950's when immigrants began to settle here. During the 1960's, vinyl singles were imported from Jamaica to sell in UK shops. Reggae is now known as the national music of Jamaica. **It developed from:**

MENTO

A form of Jamaican **folk music** like **Calypso** popular

SKA

Fast dance music that emerged in the 1950's fusing **American R&B with MENTO** rhythms and featuring electric guitar, jazzy horn sections and characteristic **offbeat rhythms**

ROCK STEADY

A more **vocal style of dance music** which used riffs, simple harmonies, offbeat rhythms and a **strong bass line**

BOB MARLEY was a famous reggae singer, songwriter, and musician who first became famous in his band The Wailers, and later as a **SOLO ARTIST**. He was born Nesta Robert Marley in 1945 in Nine Mile, Jamaica. Although he grew up in poverty, he surrounded himself with music. Bob Marley became involved in the Rastafarian movement and this influenced his music style greatly. His career flourished and he became a cultural icon and an international star.



What are Reggae songs about?

The **LYRICS** of Reggae songs are closely linked to **RASTAFARIANISM** and are often political including themes such as love, brotherhood, peace, poverty, anti-racism, optimism and freedom.

Offbeat Rhythms and Syncopation

On beat = strong beats e.g.

1	2	3	4	1	2	3	4
★		★		★		★	

Offbeat = weak beats (BACK BEAT) e.g.

1	2	3	4	1	2	3	4
	★		★		★		★

Syncopation is a way of changing a rhythm by making some notes a bit earlier or later than the pulse. It makes the listener feel a little unsteady.



KEY WORDS AND MEANINGS:

Mento	A form of Jamaican folk music. Popular in the 1950s. Uses acoustic instruments, such as acoustic guitar, banjo, hand drums, and the rhumba box.
Ska	Fast dance music which emerged in the 1950s and fused R&B with Mento. Electric guitar, jazzy horns and offbeat rhythms.
Rock Steady	A more vocal style of dance music. Riffs, simple harmonies, offbeat rhythms and strong bass line.
Rastafarian	A religious movement worshipping Haile Selassie as the Messiah and that black people are the chosen people and will eventually return to their African homeland
Syncopation	A rhythm where the notes sound a little earlier or later than the main beats.
Offbeat	Rhythms that stress the weak beats of the bar e.g. 2 and 4. A feature of Reggae is the back beat – an offbeat rhythm.
Lyrics	The words of a song
Strong beats/ Weak beats	STRONG = the main beats e.g. 1 and 3. WEAK = the 'back' beats e.g. beats 2 and 4.
Riffs	A short, repeated phrase, typically used as an introduction or refrain in a song.
Call and Response	Two distinct phrases usually written in different parts of the music, where the second phrase is heard in response to the first.
Triad	A chord made up of three notes (the root – or 1 st , the 3 rd and the 5 th)
Tonic/ Dominant/ Subdominant	TONIC – the first note of a scale (the most important note) DOMINANT – the 5 th note of a scale (the second most important) SUBDOMINANT – the 4 th note of a scale (the third most popular)

Religion and Ethics

9.01 Introduction to Ethics

1	Morality	Ideas about right and wrong
2	Ethics	The study of how we decide what is right and wrong
3	Ethical dilemma	A situation where all options have moral advantages and disadvantages
4	Utilitarianism	The theory that actions are right if they produce the greatest happiness for the greatest number
5	Hedonic Calculus	A way of measuring how much pleasure or pain an action might cause
6	Higher / Lower Pleasures	Mill's idea that some pleasures (thinking, learning) are better than others (basic physical pleasure)
7	Natural Law	Aquinas' theory that says actions are right if they follow our natural purpose, given by God
8	Primary Precepts	Basic moral principles in Natural Law (e.g. preserve life, reproduce)
9	Absolute morality	The idea that some actions are always right or wrong, no matter the situation
10	Relative (morality)	The idea that what is right or wrong can change depending on the situation
11	Situation Ethics	The belief that the most loving action is always the right one
12	Agape	Selfless, unconditional love for others
13	Autonomy	The right to make your own decisions about your life
14	Sanctity of Life	The belief that life is sacred because it is created by God
15	Quality of Life	A measure of how good a person's life is in terms of wellbeing

16	Personhood	The qualities that give a being moral value and rights
17	Revelation	The belief that God reveals truth or guidance to humans
18	Qur'an	The holy book of Islam, believed to be the word of Allah
19	Hadith	Recorded sayings and actions of the Prophet Muhammad
20	Sharia	Islamic laws based on the Qur'an and Hadith
21	Authority	A source people trust for guidance (e.g. religious texts or leaders)
22	Empathy	The ability to understand and share the feelings of others

Religion and Ethics

Religion and Ethics

Ethical Dilemmas

- An ethical dilemma is a situation where a person must choose between two options and each option has both morally good and morally bad consequences.
- Ethical dilemmas involve conflict between values, duties or consequences and there is no clear right or wrong answer.
- **The Trolley Problem** is a thought experiment where doing nothing results in five people dying and pulling the lever results in one person dying instead.
- **R v Dudley and Stephens (1884)** is a real example of an ethical dilemma. Two sailors killed a young cabin boy in order to survive and the court ruled that necessity is not a defence for murder.

Humanist Morality

- **Humanism is a non-religious (secular) worldview** based on shared values, not strict rules or membership.
- Many people in the UK live by humanist values even if they do not identify as Humanist.
- Humanist morality is shaped by empathy, reason, autonomy and concern for human welfare in the here and now.

Natural Law

- **Natural Law** was developed by **St Thomas Aquinas** in the 13th century. It is part of the Catholic Church's moral law and teaches that God created the world with a purpose that humans can discover using reason. Aquinas believed humans naturally seek what is good and avoid what is evil.
- **The five Primary Precepts** are: (1) preserve life, (2) live in an ordered society, (3) worship God, (4) educate children, (5) reproduce. Secondary precepts are the practical rules that follow from these precepts.

Criticisms of Natural Law

- One criticism is that following Natural Law can **lead to harmful consequences** because it does not consider the outcomes of an action. An example is abortion: if it is forbidden in all circumstances, people may seek unsafe and illegal procedures.
- Another criticism is that the Five Primary Precepts can **contradict** each other, such as preserving life versus reproduction.
- A further criticism is that Natural Law **depends on belief in the Christian God**. As fewer people today believe in God, some argue it is not a useful or universal moral theory.

Revelation as a Source of Morality

- **God (Allah) is the ultimate source of morality in Islam**; what is right and wrong is grounded in God's nature and will, not human opinion. God reveals moral guidance to humans through revelation.
- The Qur'an is believed to be the literal word of Allah and contains moral laws and guidance for how Muslims should live. The Hadiths (records of the Prophet Muhammad's words and actions) help Muslims understand how to apply Qur'anic moral teachings in everyday life.
- Allah's moral guidance reflects His nature, shown through the 99 names of Allah, such as The All-Wise and The Most Merciful, which shape understanding of justice, compassion and responsibility.
- Different schools of Islamic thought (e.g. Hanafi, Hanbali, Ja'fari) interpret and apply God's law in different ways, leading to variation across cultures and over time (for example, teachings on modesty).

Religion and Ethics

Religion and Ethics

Situation Ethics and Criticisms

- **Situation Ethics** is the idea that a person should choose the **most loving action** in each situation rather than following fixed rules.
- **Joseph Fletcher** developed the theory and taught that agape love should guide all decisions. Situation Ethics uses **relative morality**, meaning the right action depends on the situation.
- There are **criticisms** of this approach, including the **slippery slope argument**, the problem of **relying on love alone** and examples where doing the ‘loving’ thing **may still cause harm**, such as animal testing or the case of Rosie and Gracie.

Utilitarianism

- Origins and purpose: **Utilitarianism** was developed by **Jeremy Bentham** in the late 1700s during the **Enlightenment**, when thinkers valued reason and evidence over religious authority. Bentham aimed to create a moral system that **did not rely on God**.
- **Greatest happiness principle**: Bentham argued that the morally right action is the one that produces **the greatest happiness for the greatest number**. Utilitarianism is **consequence-based**, meaning outcomes matter more than intentions.
- **Measuring happiness and Mill’s development**: Bentham introduced the **Hedonic Calculus** (intensity, duration, certainty, purity, extent) to measure pleasure and pain. **John Stuart Mill** later refined utilitarianism by arguing that higher pleasures (intellectual and moral) are more valuable than lower, physical pleasures.

Criticisms of Utilitarianism

Utilitarianism strengths:

- Utilitarianism is **pragmatic** because Bentham’s Hedonic Calculus gives a clear method for weighing pleasure and pain, and it is fair and impartial because everyone’s happiness counts equally.

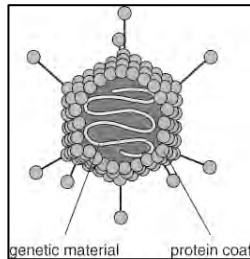
Utilitarianism challenges:

- **Difficulty predicting consequences**: Utilitarianism is criticised because it relies on future outcomes, but humans **cannot accurately predict** certainty or duration of pleasure and pain, meaning decisions may be based on guesses.
- **Survival Lottery criticism**: **John Harris’ Survival Lottery** shows how utilitarianism may justify killing one healthy person in order to save several others, which many see as **immoral** because it violates individual rights and trust.

Biology GCSE Transition**1. Diseases**

Disease	Something that makes you ill, such as infection by a pathogen or not having a healthy diet
Pathogen	A microbe that causes disease e.g., polio virus
Infectious disease	Caused by a microbe that gets into the body and changes how it works e.g., polio
Deficiency disease	Caused by the lack of a nutrient needed for good health e.g., anaemia
Genetic disease	Caused by a fault in DNA that changes how cells work e.g., haemophilia
Lifestyle disease	How we live can increase the risk of getting these diseases
Example of a lifestyle disease	Smoking can cause lung cancer
Autoimmune disease	When the body's immune system attacks and damages cells in the body e.g., Type 1 diabetes
Communicable disease (also called <i>infectious disease</i>)	A disease that can be passed from an infected person to an uninfected person
Structure of a virus	An outer protein coat that protects the genetic material inside

Why viruses are not a living organism	They cannot carry out all the life processes
How a virus infects a cell	It takes over the cell's genetic material and makes the cell produce more viruses , which break open the cell membrane and escape to infect other cells

**Structure of a virus****2. Control Systems**

How the nervous system works	Receptor cells in sense organs detect stimuli; a receptor cell produces electrical impulses that travel along nerve cells in nerve to the spinal cord , and then usually to the brain ; the brain processes the information in the impulses; the brain sends electrical impulses through nerves in the spinal cord to effectors (muscles and glands); muscles respond by contracting; glands respond by releasing hormones
------------------------------	--

Hormone	A chemical messenger that is released from a gland into the blood and carried around the body
Target cell or organ	Cells or organs that respond to hormones by changing what they are doing
Example of a hormone and its effect	Oestrogen controls changes in a girl's body during puberty
How the nervous system is different to the hormonal system	Electrical impulses travel quickly along nerves; hormones travel in the blood

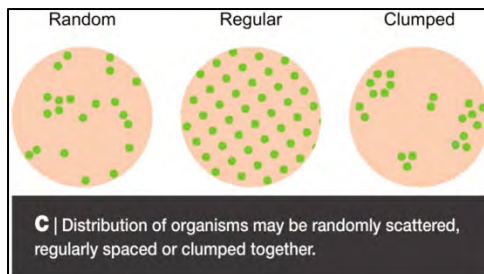
3. Testing Medicines

Medicine	A drug that helps the body to ease the symptoms of a disease or cure the disease
Antibiotic	Treats bacterial infections by killing the pathogen
Antiviral	Treats viral diseases
Vaccine	Used to immunise people <i>before</i> they get ill so that they are protected from a particular pathogen
Side-effect	Unintended effects of medicines that may be harmful
Stages of testing new medicines	Stage 1: on diseased cells or organs to see how well the medicine affects the pathogen and cells

	- Stage 2: on animals to see how a whole body reacts to the medicine, without risk to humans - Stage 3: on a few healthy people to make sure the drug is safe and to find general side-effects - Stage 4: clinical trial on many patients to make sure the drug works, to find the right dose and to check for side-effects in different groups
Using a control group	Group of people that is similar to the test group in stage 4 and receives a placebo , against which the results of the new treatment will be compared
Placebo	Something that looks like the real medicine but contains no drug
Why a placebo is taken	To stop the placebo effect (when a patient gets better because they think they have received a medicine, even when they haven't)
Getting the correct results in stage 4	Patients are randomly placed in each group to reduce the risk of bias

4. Ecology

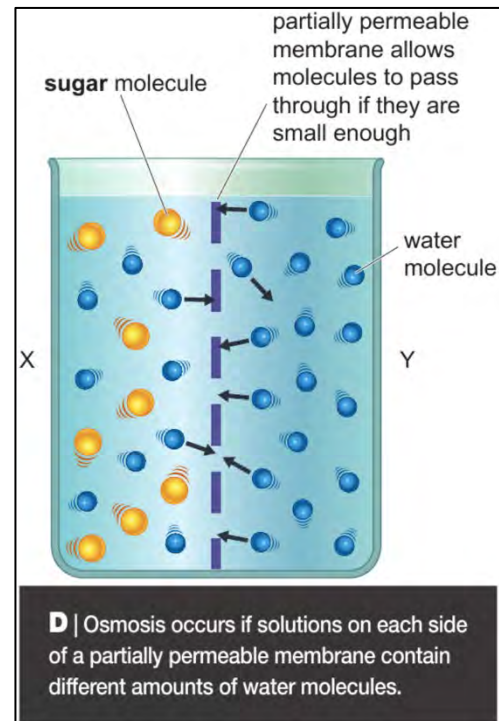
Abundance	The number of organisms in an area
Estimating population size	Population size = number of organisms in sample x (total size of area ÷ area of sample)
Distribution	How the organisms are spread throughout an area
Sampling techniques	Quadrat for organisms that don't move e.g., plants; pitfall trap for animals that crawl on the ground, e.g., beetles; sweep net for small organisms in tall plants e.g., insects sitting on long grass



5. In And Out

Diffusion	When particles spread and mix with each other without anything moving them
Surface area : volume ratio	Larger organisms have a smaller SA : V ratio than smaller organisms
Osmosis	The type of diffusion that describes the overall movement of solvent molecules in a

solution across a **partially permeable membrane**



Y contains more water molecules, so the overall movement of water molecules will be from Y to X by osmosis

Chemistry GCSE Transition

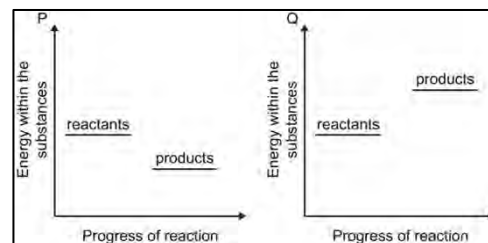
1. Ions

Atom	Has no overall charge as the negative charge of the electrons balances the positive charge of the central nucleus
Ion	An atom that has a tiny electrical charge
How a positive ion is formed	When an atom loses one or more electrons
How a negative ion is formed	When an atom gains one or more electrons
Ionic bond	A strong force between oppositely charged ions
When ionic compounds can conduct electricity	Only if the ions can move e.g., when the compound is dissolved in water or is liquid
Structure of a metal	A lattice of positive ions sitting in a sea of negative electrons
Metallic bonding	Forces of attraction between the opposite charges that hold the metal together
Why metals can conduct electricity	The electrons can move

2. Energy Transfers

When metallic bonding is stronger	If there are more free electrons and ions with more charges
Endothermic	Any change that takes energy in from the surroundings, which normally decreases the

	temperature of the surroundings e.g., melting
Exothermic	Any change that gives out energy to the surroundings, which normally increases the temperature of the surroundings e.g., freezing
Reaction profile	Shows the changes in energy of reactants and products during a reaction

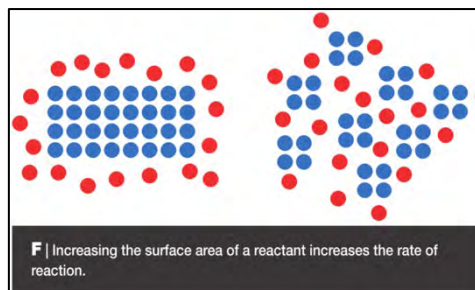


Q is an endothermic reaction because the products have more energy than the reactants

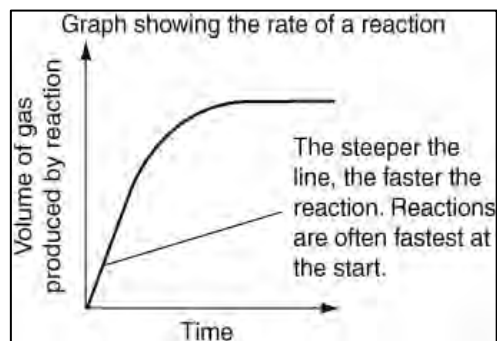
3. Rates Of Reaction

Rate of reaction	How quickly a reaction occurs
Example of a slow reaction	Iron rusting
How to measure the rate of reaction	Measure how quickly the reactants are used up or how quickly the products are formed
What is needed for two particles to react	They must collide hard enough or with enough energy

When reactions occur faster	If more reactant particles can collide with each other
How to increase the number of colliding particles	Increase the surface area of a reactant



Why reactions get slower as they progress	There are fewer and fewer reactant particles
---	---



The horizontal line on the graph shows that the reaction has stopped

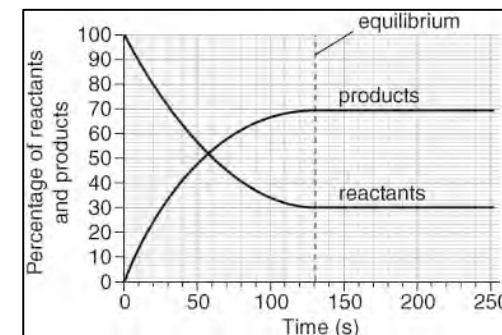
4. Chemical Equations

Salt	An ionic compound produced in a neutralisation reaction
Neutralisation reaction	An acid reacts with an alkali or a base to

	produce a salt and water
Example of a neutralisation reactions	Hydrochloric acid + copper oxide → copper chloride + water
State symbols	Solid (s); liquid (l); gas (g); aqueous (aq)

5. Equilibria

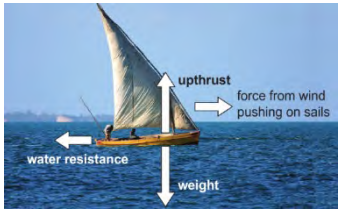
Reversible reaction	Can go both backwards and forwards
Example of a reversible reaction	$3\text{H}_2(\text{aq}) + \text{N}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$ A double arrow shows a reversible reaction
Dynamic equilibrium	When there are constant changes going on but these changes are equal and opposite and so do not affect the overall levels of something
A reversible reaction reaches a dynamic equilibrium	When the amounts of the products and the reactants do not change



At equilibrium, the rate of the forwards and backwards reactions are the same

9I Forces and Motion

1. Forces and Movement

Friction	Force between two surfaces sliding across each other.
Reducing Friction	Using rollers or wheels / sleds in snowy countries
Balanced	When a force acting on an object is the same size as the force in the opposite direction.
Constant Speed	Caused by balanced forces acting on an object.
Unbalanced	Forces acting in opposite directions are not equal.
Resultant	The difference between the forward and backward force.
Accelerate	Get faster- caused by unbalanced forces.
Boat Force Diagram	
Drag	Acts to slow down objects moving through fluids (liquids/gases) <i>e.g. water resistance and air resistance</i>
Top Speed	Dependent on the maximum force a vehicle can move forwards an on the friction/drag acting to slow it down.

2. Energy For Movement

Food	Supplies humans the energy they need.
Solar Energy	Energy stored in food originally came from the Sun.
Kinetic Energy	Stored in anything that is moving.

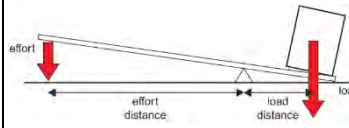
Fossil Fuel	Fuels formed by remains of plants / animals that store large amounts of energy. <i>e.g. coal, oil, natural gas</i>
Non-Renewable	Resources that will run out one day like fossil fuels.
Using Fossil Fuels	Energy stored in oil and natural gas is used for transport. Energy released by burning fuels is transferred by heating for cooking or keeping warm
Gravitational Potential	Energy stored in raised objects.
Elastic Potential	Energy stored in stretched or squashed objects.
Thermal	Energy stored in the movement of particles. Transferred from hot objects to cooler ones by heating.
Renewable	Resources that will not run out. <i>e.g. wind, moving water</i>
Nuclear Energy	Non-renewable resource used to generate electricity.
Electricity	Cannot be stored, has to be generated by renewable or non-renewable resources.
Conservation of Energy	Energy cannot be created or destroyed, only transferred.
Efficiency	The useful energy transferred compared to the total energy transferred by a device.
Dissipated	Energy that spreads out.
Transfers	Energy is often transferred by heating or sound.

3. Speed

Speed	How far something can travel in a certain time.
Units	Dependent on measurements taken <i>e.g. miles per hour, metres per second</i>

Speed Formula	$\text{speed} = \frac{\text{distance}}{\text{time}}$
Mean Speed	Total distance travelled, divided by the total time taken.
Distance-Time Graph	Used to show how fast someone travelled during a journey. Also called a displacement-time graph
Displacement	Distance in a straight line between an object and its starting point.
Horizontal Line	Shows an object isn't moving on the distance-time graph.
Steep Line	Shows an object is moving quickly
Relative	Looking speed compared to another object which may be moving.

4. Turning Forces

Lever	Long bar used to lift heavy objects.
Pivot / Fulcrum	Point that the lever turns around.
Effort	Force applied down on lever.
Load	The object being lifted.
Lever Diagram	
Force Multiplier	Effort distance is greater than the load distance meaning that the effort force is smaller than the force lifting the load.
Distance Multiplier	Large effort force moves a small distance and the load is moved a greater distance.
Moment	The turning effect of a force.
Units	Moments are measured in newton metres (N m)

Moment Formula

$$\text{moment of the force (N m)} = \text{force (N)} \times \text{perpendicular distance from the pivot (m)}$$

Equilibrium Opposing forces are balanced.

5. More Machines

Machine	Anything that helps us work with forces.
Ramp	A simple machine that means less force is needed to push an object up a slope compared to lifting.
Pulleys	Makes lifting a load easier by pulling down a rope.
Work	Amount of energy transferred when a force moves something.
Units	Work is measured in Joules (J)
Work Done Formula	$\text{work done (J)} = \text{force (N)} \times \text{distance moved in the direction of the force (m)}$
Conservation of Energy	If a smaller force is needed to move something, the force has to move through a greater distance.

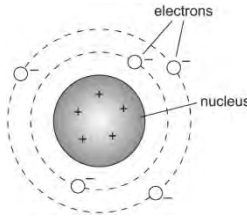
Lesson	Memorised?
1. Forces and Movement	
2. Energy For Movement	
3. Speed	
4. Turning Forces	
5. More Machines	

9J Force Fields and Electromagnets

1. Force Fields

Force Field	The area around something where a non-contact force can affect things.
Non-Contact Force	A force which can affect something from a distance.
Magnetic Field	The space around a magnet where it can affect magnetic materials or other magnets.
Repel	To push away. Two of the same poles will repel each other.
Attract	To draw together. A north and a south pole will attract each other.
Earth's Magnetic Field	Protects the Earth from charged particles emitted by the Sun
Mass	The amount of matter that something is made up of- measured in grams / kilograms.
Gravitational Field	The space around any object with mass where its gravity attracts other masses.
Gravitational Field Strength	The force with which a gravitational field pulls on each kilogram of mass. Earth's gravitational field strength is approximately 10 N/Kg.
Weight	The amount of force with which gravity pulls things. Measured in Newtons. $\text{Weight} = \text{mass} \times \text{gravitational field strength}$
Gravitational Potential Energy (GPE)	Energy stored in objects in high places that can fall down.

2. Static Electricity

Static Electricity	A positive or negative charge on an insulating material caused when rubbing transfers electrons from one material to another.
Nucleus	The central part of an atom- has a positive charge.
Electrons	Small particles moving around the nucleus in an atom- have a negative charge
Atom	
Charges	Something with a charge of static electricity can attract uncharged objects. Two charged objects can attract or repel each other.
Electric Field	The space around an object with a charge of static electricity where it can affect other objects.

3. Current Electricity

Electric Current	The flow of electrons in a circuit.
Current in Series	The current is the same everywhere in a series circuit.
Current in Parallel	The current through the cell splits up when it comes to a junction in a parallel circuit.
Ammeter	Connected in series and used to measure the current flowing through a circuit- measured in amperes (A).
Voltage	How much energy is transferred by electricity by a cell / component.

Voltmeter

Connected in parallel and used to measure the voltage of a component- measured in volts (V)

4. Resistances

Resistance	How difficult it is for electricity to flow through something.
Resistors	A component that makes it difficult for electricity to flow. Used to reduce the size of the current in a circuit.
Factors Affecting Resistance	Increasing the length of a wire or decreasing the thickness will increase the resistance.
Insulators	Do not conduct electricity- they have very high resistances.
Ohms	The units for measuring resistance- Ω
Calculating Resistance	$\text{Voltage} = \text{current} \times \text{resistance}$

5. Electromagnets

Electromagnets	A coil of wire with electricity flowing in it that has a magnetic field around it.
Increasing Electromagnet Strength	Increasing the number of coils. Increasing the current in the wire. Using a magnetic material as a core.
Relays	A small current is used to switch on a circuit that carries a much bigger current

Motor Effect

The force produced when a wire carrying a current is placed in a magnetic field.

Electric Motor

A coil of wire in a magnetic field. The coil spins when a current flows through it.

Lesson	Memorised?
1. Force Fields	
2. Static Electricity	
3. Current Electricity	
4. Resistances	
5. Electromagnets	

Physics GCSE Transition

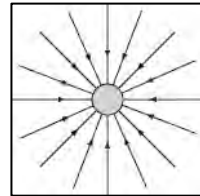
1. Differences

Potential differences	Causes currents to flow in circuits
Temperature differences	Causes energy to be transferred between objects by heating
Why a cold drink taken from the fridge will warm up	The air in the room is warmer than the drink, so energy is transferred from the air to the drink until both are at the same temperature
Latent heat	The energy needed to break the bonds between particles in melting or evaporating , or the energy released when these bonds form in condensing or freezing
Specific heat capacity	The energy needed to raise the temperature of 1 kg of a substance by 1 °C
Convection current	A flow of liquid or gas caused by part of it being heated or cooled more than the rest
How a land breeze occurs	At night the land cools down faster than the sea because it has a lower specific heat capacity, so the air above the land is cooler than the air above the sea; the air above the sea is less dense than the air above the land,

	and so it tends to rise and create lower air pressure over the sea; air above the land is at higher pressure, so it flows out over the sea; the breeze blows from land to sea
--	---

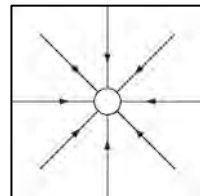
2. Fields

Force field	The volume around something where a non-contact force can affect things
Electric field	The space around an object with a charge of static electricity where it can affect other objects



The arrows show the direction a positive charge would move

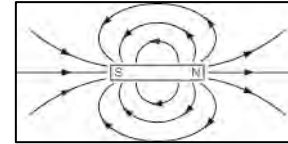
Gravitational field	The space around any object with mass where its gravity attracts other masses
---------------------	---



The direction of a gravitational field is always towards the mass

Magnetic field	The space around a magnet where it can affect magnetic
----------------	--

	materials or other magnets
--	----------------------------



The arrows show the direction a north pole would move

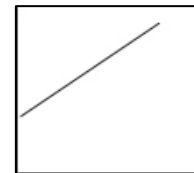
Calculating gravitational potential energy	Gravitational potential energy (in J) = mass (in kg) × height (in m) × gravitational field strength (in N/kg)
--	--

3. Cause And Effect

Correlation	When two things happen together, such as one variable increasing as another increases, or two variables changing with time in a similar way
-------------	---

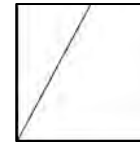
4. Links Between Variables

Equation for a straight line	$y = mx + c$ y is the dependent variable, m is the gradient, x is the independent variable, c is the point where the line crosses the vertical axis
Linear relationship	A relationship between variables that produces a straight line



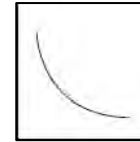
The line does not have to go through the (0,0) point

Direct proportion	A relationship between two variables where one variable doubles when the other doubles
-------------------	---



The graph is a straight line through (0,0)

Inverse proportion	A relationship between two variables where one variable doubles when the other halves
--------------------	--



Example: If the cross-sectional area of a wire is doubled, its resistance halves

Distance-time graph	The gradient of the line tells you the speed
Speed-time graph	The gradient of the line tells you the acceleration and the area under the graph tells you the distance the object has moved

5. Models

What models can be used for	To help us understand how things work; to test new technology
Abstract model	A model that only exists in your thoughts or as a computer program, formula or diagram
Physical model	A model that you can touch or a model that you could build e.g., wind tunnel

REFLEXIVE VERBS in the PRESENT

Subject Pronoun	Reflexive Pronoun	Example
Je	Me (m')	Je me lève (I get up)
Tu	Te (t')	Tu te brosses les dents (You brush your teeth)
Il/elle/on	Se (s')	Elle se maquille (She puts on makeup)
Nous	Nous	Nous nous réveillons (We wake up)
Vous	Vous	Vous vous habillez (You get dressed)
Ils/elles	Se (s')	Ils se couchent (They go to bed)

Opinions & Pronoun phrases

J'aime beaucoup
Je préfère

Ça m'intéresse
Ça m'amuse
Ça me fascine

*Ça me plaît
*Ça me rend content(e)

Je pense que (c'est...)
Je trouve que..
À mon avis...

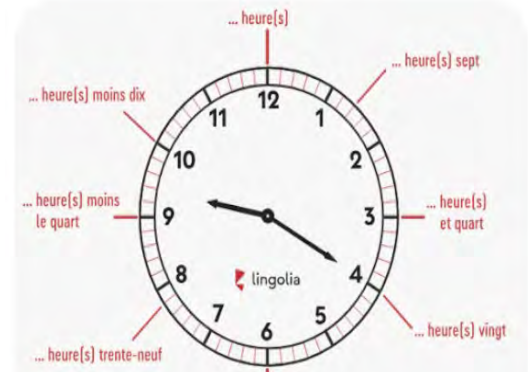
J'ai horreur de
Je n'aime pas du tout

Ça me stresse
Ça m'énervé
Ça m'ennuie
Ça m'embête

J'aime
Je pense que
J'adore
Je trouve
Je déteste



À (at) / VERS (at around)



1

3

6

Décris ta routine/ ton train train (quotidien)

1. Je me lève I get up
2. Je me lave I have a wash
3. Je me brosse les dents I brush my teeth
4. Je me douche I shower
5. Je prends le (mon) petit-déjeuner I have breakfast/ (or my) breakfast
6. Je vais au collège (à pied / vélo / en bus / en voiture) I go to school (by foot/ by bike / on the bus/ by car)
7. Je quitte le collège I leave school
8. Je rentre chez moi I return home
9. Je mange le (or mon) dîner I eat dinner/ (or my) dinner
10. Je fais mes devoirs I do my homework
11. Je me repose I rest

2

CONNECTIVES

aussi / également aussi
mais/ cependant but/ however
par contre / en revanche on the other hand
car / parce que / puisque because
étant donné que given that
alors/ donc so/ therefore
de plus/ en plus additionally

4

Infinitive CONSTRUCTION: COMPLEX

J'AIMERAIS/JE VOUDRAIS me lever
I'd like to get up
JE DÉTESTE me lever I hate getting up
JE VEUX prendre I want to take
JE PRÉFÈRE aller I refer to go
JE DOIS me coucher I have to go to bed

5

Quand?

When?

LE matin IN THE morning
à sept heures DU matin: at 7 o'clock in the morning
VERS sept heures at around 7 o'clock
tous les jours Every day
chaque jour Each day
en semaine In the week
L'après-midi In the afternoon
le soir In the evening

Pendant les vacances During the holidays
Quand je me lève When get up
puis then
ensuite next

tard late
tôt early
de bonne heure early

EXTENSION: THE PERFECT TENSE OF REFLEXIVE VERBS

QUAND?

1. hier
2. le week-end dernier
3. la semaine dernière

WHEN?

1. yesterday
2. last weekend
3. last week



Reflexive pronouns are used to indicate an action that happens to the subject.

E.g: He washes himself / He washed himself

E.G: Present: **Il se** lave / Past: **Il s'est** lavé

Reflexive pronouns must take **être** as an auxiliary when used in the past tense.

1. Subject	2. Reflexive Pronoun	3. Auxiliary - être	4. Past Participle
Je	me	suis	lavé(e)
Tu	t'	es	lavé(e)
Il	s'	est	lavé
Elle	s'	est	lavée
Nous	nous	sommes	lavé(e)s
Vous	vous	êtes	lavé(e)s
Ils	s'	sont	lavés
Elles	s'	sont	lavées

ORCA



OPINION	REASON	CONNECTIVE	ANOTHER'S OPINION
😊 J'aime (assez/ beaucoup) J'adore Je préfère 😊 Je n'aime pas (du tout) Je déteste	à mon avis je pense que je crois que je trouve que In my opinion I think that I believe that I find that	Aussi En plus Mais Cependant Néanmoins même si	Mon copain / mon père Ma copine / ma mère pense que c'est...
😊 Intéressant(s) Amusant(e)s Joli(e)s Propre(s) Calme(s) 😊 Ennuyeux/ennuyeuse(s) Difficile(s) Bête(s) Bruyant(e)s Sale(s) Laid(e)s Antipathique(s)			

Opinion Reason Connect Another's opinion
O R C A

PAST

Je suis allé[e]

à la ... / au ... / aux .../

où + 2 PAST tense actions

J'ai regardé ...

ensuite

j'ai joué au..

(j'ai visité/ j'ai mangé

Irreg: (j'ai fait /j'ai bu/j'ai lu/j'ai vu)* **j'ai dû + inf (I had to)**• Add www

• J'ai aimé ça

Ça m'a plu

Ça m'a amusé/Ça m'a ennuyé/ Ça m'a
RENDU triste/heureux Ça m'a fait rire

parce que

J'ai pensé / j'ai trouvé que

c'était/ ce n'était pas + ADJ.

PRESENT

Je vais

/ à la ... / au ... / aux .../

où + 2 present tense actions

je regarde

et aussi

je joue

(je visite/ je mange

Irreg: je fais/ je bois/ je lis* **Je dois (I have to) + inf**Add www

J'aime ça

Ça me plaît

Ça m'amuse/ Ça m'ennuie/

Ça me rend triste/ heureux

Ça me fait rire

parce que

Je pense / je trouve que

c'est/ ce n'est pas + ADJ

FUTURE

Je vais aller

à la ... / au ... / aux .../

où + 2 future tense actions

je vais+inf ...

et aussi

je vais+inf..

(jouER /visitER / mangER/boiRE / voir / faire)

* **Je devrai + inf**Add www

Je vais aimer ça

Ça me plaira

Ça m'amusera/ Ça m'ennuiera/

Ça me rendra triste or heureux

Ça me fera rire

parce que

Je pense / je trouve que

CE SERA / CE NE SERA PAS+ ADJ

Conditional

Je voudrais aller

à la ... / au ... / aux .../

où + 2 conditional tense actions

je visiterais...

et ensuite

je mangerais...

(je jouerAIS //je boirais / je verrais/ je ferais)

* **Je devrais + inf**Add www

J'aimerais ça

Ça me plairait

Ça m'amuserait/ Ça m'ennuierait/

Ça me ferait rire

parce que

Je pense / je trouve que

CE SERAIT / CE NE SERAIT PAS+ ADJ

À l'avenir

In the future

EBI : Si je pouvais

If I could

- | | |
|---------------------------------------|-----------------------------|
| 1. je changerais beaucoup/peu | I would change a lot/little |
| 2. je voudrais (+infinitive) | I would like |
| 3. je voudrais pouvoir (+infinitive) | I would like to be able |
| | |
| A. me lever | To get up |
| B. me coucher | To go to bed |
| C. manger | To eat |
| D. aller au collège | To go to school |
| E. rentrer chez moi | To return home |
| F. avoir/ passer plus de temps au lit | To have/ to spend more time |
| | in bed |
| G. avoir plus de temps chez moi | To have more time at home |
| H. avoir plus de temps au collège | To have more time at school |

tôt Early

tard Late

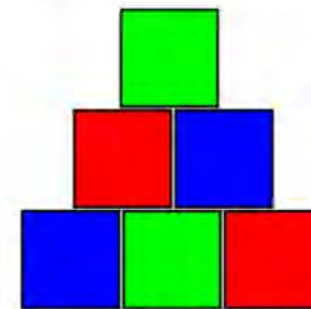
plus tôt Earlier

(Une heure) plus tard (An hour) later

What are conditional tense verbs?

- Conditional tense verbs describe an action that would happen in the future (if, for example, something else were to happen as well).
- Examples in English are: I would run and I would hide (if a bear was chasing me!).

VERBS ARE LIKE BUILDING BLOCKS BECAUSE THEY LOOK TO THE FUTURE. AS A RESULT, YOU ADD ENDINGS TO INFINITIVES.



Think of it as building to the future OR in the case of the conditional tense, how things would be (in the future).

Je	Stem + <i>ais</i>
Tu	Stem + <i>ais</i>
il/elle/on	Stem + <i>ait</i>
Nous	Stem + <i>ions</i>
Vous	Stem + <i>iez</i>
ils/elles	Stem + <i>aient</i>

Exemples :

- A. Je chang*ER***AIS**:
I'd change
- B. Je me lèv*ER***AIS**:
I'd get up
- C. Je me couch*ER***AIS**:
I'd go to bed

1

TENSES**PRESENT**

1. Je danse – I dance

PAST

Perfect:

2. J'ai dansé – I danced / I did dance

Imperfect

3. Je dansais – I used to dance

FUTURE

Near future

4. Je vais danser – I am going to dance

CONDITIONAL

5. Je danserais – I would dance
6. Je voudrais / j'aimerais DANSER : I'd like to dance.

2

FREQUENCY / TIME phrasesToujours always/stillSouvent oftenQuelquefois sometimesRarement rarely

De temps en temps

From time to time

Jamais never

Le matin/tous les matins - in the morning/every morning

3

Opinions & Pronoun phrases

J'aime beaucoup 🤩🤩

Je préfère

J'ai horreur de

Je n'aime pas du tout

Ça m'intéresse

Ça m'amuse

Ça me fascine

Ça me stresse

Ça m'énervé

Ça m'ennuie

Ça m'embête

*Ça me plaît

*Ça me rend content(e)

Je pense que (that...)

Je trouve que

A mon avis...

aimer - like

aimer - love

adorer - adore

trouver - find

détester - hate

4

CONNECTIVESaussi / également aussimais/ cependant but/ howeverpar contre / en revanche on the other handcar / parce que / puisque becauseétant donné que given thatalors/ donc so/ thereforede plus/ en plus additionally

5

Complexity

Je dois... = I must...

Je devrais... = I should...

Je peux... = I can...

Je pourrais... = I could...

Il faut... = You must / It is necessary

adjectivessain / saine healthynutritif / nutritive nutritiouséquilibré(e) balancednaturel(le) naturalfrais / fraîche freshléger / légère lightbiologique (bio) organic

vitaminé(e) full of

vitamins

énergétique energy-giving

délicieux /

délicieuse delicious

pauvre en graisse low in fatriche en rich in

6

INTENSIFIERSVraiment trulyExtrêmement extremelySurtout especiallyAssez quiteUn peu a bit

Incroyablement

incrediblytoujours alwayspresque almostun peu a littlejamais neversouvent oftenparfois sometimestrop too

Body and Illness

Où as-tu mal ?	Where does it hurt?
J'ai mal (+au/à la/aux) ...	My ... hurts
à la tête	Head
à la gorge	Throat
à la jambe	Leg
au bras	Arm
au cou	Neck
au dos	Back
au pied	Foot
au ventre	Stomach
aux oreilles	Ears
aux yeux	Eyes
aux dents	Teeth
J'ai vomi	I've been sick
J'ai un coup de soleil	I have a sunburn
J'ai un rhume	I have a cold
J'ai la grippe	I have flu
J'ai de la fièvre	I have a fever
J'ai une toux/je tousse	I have a cough

Healthy Eating habits

Je (ne) suis (pas) en bonne forme	I'm (not) fit/healthy
Je (ne) suis (pas) sain(e)/en bonne santé	I am (not) healthy
Je bois de l'eau	I drink water
Je bois des boissons gazeuses	I drink fizzy drinks
Je (ne) mange (pas) sainement	I (don't) eat healthily
Je mange des sucreries	I eat sweets
Je mange du chocolat	I eat chocolate
Je mange des légumes	I eat vegetables
Je mange des fruits	I eat fruit
J'adore manger du fast-food	I love eating fast food
Ne...jamais	Never
Je fais de l'exercice	I exercise
Je (ne) suis (pas) actif/active	I am (not) active
Je dors huit heures par nuit	I sleep eight hours per night

Staying healthy

Je vais (+infinitive)	I'm going
Je dois (+infinitive)	I have to/must
Je peux (+infinitive)	I can
Je veux (+infinitive)	I want
Manger sainement	To eat healthily
Manger moins de	To eat less/fewer
Boire plus de	To drink more
Dormir plus	To sleep more
Éviter de	To avoid

What you would change

Je changerais beaucoup/peu	I would change a lot/little
Je voudrais pouvoir (+infinitive)	I would like to be able (to...)
Me lever	To get up
Me coucher	To go to bed
Retourner chez moi	To return home
Avoir plus de temps au lit/chez moi	To have more time in bed/at home
Tôt	Early
Tard	Late
Plus tôt	Earlier
(Une heure) plus tard	(An hour) later

PAST

PRESENT

FUTURE

Conditional

Where	What x2	Why
Je suis allé(e) à la ... / au ... / aux ... où + 2 PAST tense actions J'ai regardé ... ensuite J'ai joué au... (J'ai visité) J'ai mangé Irreg: (J'ai fait / J'ai bu) / (J'ai lu) / (J'ai vu) * J'ai eu + inf (I had to) Add <u>www</u>	Je vais / à la ... / au ... / aux ... où + 2 present tense actions je regarde et aussi je joue (je visite) je mange Irreg: je fais/ je bois/ je lis * Je dois (I have to) + inf Add <u>www</u>	Je vais aller à la ... / au ... / aux ... où + 2 future tense actions je vais+inf ... et aussi je vais+inf.. (Jouer / visiter / manger / boire / voir / faire) * Je devrai + inf Add <u>www</u>
Where	What x2	Why
J'aime ça Ça me plaît Ça m'amuse/ Ça m'ennuie/ Ça me rendra triste/ heureux Ça me fait rire	Je aime ça Ça me plaît Ça m'amuse/ Ça m'ennuie/ Ça me rendra triste or heureux Ça me fait rire	J'aime ça Ça me plaît Ça m'amuse/ Ça m'ennuie/ Ça me rendra triste or heureux Ça me fait rire
parce que Je pense / je trouve que c'est/ ce n'est pas + ADJ	parce que Je pense / je trouve que CE SERA / CE NE SERA PAS+ ADJ	parce que Je pense / je trouve que CE SERAIT / CE NE SERAIT PAS+ ADJ



ORCA



OPINION	REASON	CONNECTIVE
J'aime (assez/ beaucoup) 😊 J'adore Je préfère 😊 Je n'aime pas (du tout) Je déteste 😡	à mon avis Je pense que Je crois que Je trouve que C'est: - Intéressant(s) Amusant(e)(s) Joy(e)(s) Prop(e)(s) Calme(s) - Ennuyeux/ennuyeuse(s) Difficile(s) Belle(s) Envoyant(e)(s) Sale(s) Last(e)(s) Antipathique(s)	Aussi En plus Mais Cependant Néanmoins même si ANOTHER'S OPINION Mon copain / mon père Ma copine / ma mère pense que c'est...

Opinion Reason Connect Another's opinion

O R C A