SPRING KNOWLEDGE ORGANISER

YEAR 9

Watercolour painting

Key tips:

- Start light and build up the dark colour.
- Allow each section to dry before adding more paint.
- If you overwork your paper it will bobble and rip.
- Watercolour painting is like Shrek- it has layers!

KEY WORDS – test yourself! (definitions on the next page)
Shadow- Highlight- Tone- Cross hatching- Hatching- Mark Making- Layering- Shape- Form- Detail

Artist Research
Year 9 Spring term

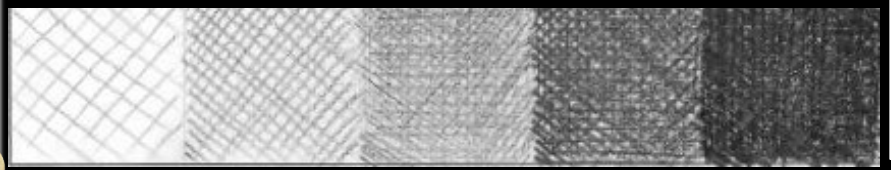
Mark Making techniques

Stippling

Hatching

Scumbling

Cross hatching



In the style of:
When creating a piece of art in the style of an artist it is very important you thoroughly understand their techniques in order to copy them effectively.
Besides using their techniques, you also need to take pride in your work and be as neat as possible. Here are some things to consider:

- Have you layered up mark making?
- Have you paid attention to detail?
- Have you shown highlights and shadows?
- Are the proportions correct?
- Have you used a combination of hatching and cross hatching?
- Is your work as neat as it can be?

KEY WORDS AND MEANINGS:	
Mark Making	The different lines, dots, marks, patterns, and textures we create in an artwork.
Hatching	A shading technique which uses a series of thin, parallel lines that give the appearance of shadow in varying degrees.
Cross hatching	The drawing of two layers of hatching at right-angles to create a mesh-like pattern.
Stippling	The creation of a pattern simulating varying degrees of solidity or shading by using small dots.
Scumbling	Scumbling is a shading technique achieved by overlapping lots of little circles.
Tone	Tone in art simply refers to how light or dark a colour is. Each colour has an almost infinite number of tones.
Layering	Simply placing one layer of colour/material/tone/technique over another.
Form	Form refers to objects that are 3-Dimensional, or have length, width, and height.
Highlight	The lightest part or one of the lightest parts of a painting, drawing, etc.
Shadow	A dark area where light from a light source is blocked by an opaque object.

Colour code: BLUE= Tier 3 words ORANGE= Tier 2 words Look out for colour coding during lessons!

Drama Knowledge Organiser

Year 9 Hamilton/Theatre Design Knowledge Organiser

Keywords:

Episodic Theatre – Scenes that stand alone and are constructed in small chunks, rather than creating a lengthy and slow build of tension

Ensemble – A group of actors who work together to create/perform a show

Evaluation - To evaluate something is to measure its worth. To evaluate drama and theatre you must be able to recognise what was and wasn't successful onstage and recognise all the elements that contribute to the impact of a production

Connotations - Refers to a meaning that is implied by a word apart from the thing which it describes explicitly

Musical Theatre - a form of theatrical performance that combines songs, spoken dialogue, acting and dance.

Previously learnt keywords and terminology

Synchronisation Monologue Soliloquy Thought tracking Multi-role Flashback Still image Narration Split focus Pitch Pace Pause Tone Volume Accent Gesture Posture Facial Expressions Projection Diction

Lighting

Spotlight Fresnel Birdie Strobe Gels Par can Flood Follow spot Gobo

Lin Manuel Miranda wrote and starred in Hamilton. Hamilton averages a whopping 144 words per minute with **20,520** total words!

Roles & responsibilities of the theatre

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

Alexander Hamilton
1757 - 1804

Evaluation sentence starters

I thought it was effective…

The piece was successful….

They achieved their objective…

I was unsure about…

I wasn't keen on…

An area to develop is…

A positive aspect was…

A negative aspect was…

List the songs you have listened to from Hamilton

* **Alexander Hamilton**
* **10 Duel Commandments**
* **You'll be back**
* **Aaron Burr Sir**
* **Schuyler Sisters**
* **Guns and Ships**
* **Helpless**
* **A Winter's Ball**

Stage Positioning		
Upstage Right	Upstage Centre	Upstage Left
Centre Stage Right	Centre Stage	Centre Stage Left
Downstage Right	Downstage Centre	Downstage Left

Audience

Stage Configurations

Proscenium Arch

Theatre in the Round

Thrust

Traverse

Promenade

The Schuyler Sisters

Arron Burr

George Washington

Thomas Jefferson & James Maddison

Drama Knowledge Organiser

Script Writing and Devising

How do we format a script?

Characters are always typed in capital letters and in Bold, followed by a colon.

Stage directions within dialogue are typed in *italics* and in brackets.

LINDA: *(frustrated)* Have we come all this way just to look at the bleedin' estate? Mickey, we're fourteen.

LINDA beams at him. MICKEY can't take it and looks the other way.

MICKEY: Look

LINDA: What?

MICKEY: There's that lad lookin' out the window. I see him sometimes when I'm up here.

LINDA: Oh…he's gorgeous, isn't he?

MICKEY: What?

Stage directions are typed in *italics*.

Dialogue is indented from the character name.

KEYWORDS:

Devising	Performance
Stimulus	Audience
Character	Playwright
Brainstorm	Dialogue
Structure	Theatre

How do we devise?

BICS!

Create a story board to come up with your story

STRUCTURE

Highlight your key scenes and keep them in the piece

BRAINSTORM

Themes

What is your educational message?

Devising

IMPROVISE

Don't just talk through – get up and just try out a scene

Try different genres. The scene could work better as a comedy or more serious

Characters

How do you know each other?

Name /age

DEVISING TECHNIQUES:

Tableau	Monologue
Slow Motion	Narration
Thought-track	Direct Address
Flashback/forward	Role-Play
Split-focus	Multi-role

Music Knowledge Organiser

Key Vocabulary Minimalism Ostinati Phasing Diatonic Synchronisation Looping Transformation Counterpoint Motif/cell Static Harmony Polyrhythms

Background

- Emerged in America 1960's
- Famous composers include Steve Reich, Terry Riley and Philip Glass
- Was completely different in that it was experimental – using unusual sounds and very limited musical material.

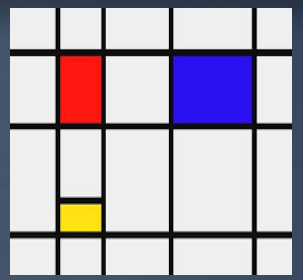

Steve Reich


Terry Riley


Philip Glass

Minimalist Music

Year 9: Term 2



"The idea of minimalism is much larger than many people realize. It includes, by definition, any music that works with limited or minimal materials: pieces that use only a few notes, pieces that use only a few words of text, or pieces written for very limited instruments, such as antique cymbals, bicycle wheels, or whiskey glasses. It includes pieces that sustain one basic electronic rumble for a long time. It includes pieces made exclusively from recordings of rivers and streams. It includes pieces that move in endless circles. It includes pieces that set up an unmoving wall of saxophone sound. It includes pieces that take a very long time to move gradually from one kind of music to another kind. It includes pieces that permit all possible pitches, as long as they fall between C and D. It includes pieces that slow the tempo down to two or three notes per minute."
Tom Johnson – Minimalist Composer

Key principles of Minimalist Music:

- Based around a small idea –cell/ motif
- Constantly repeated elements – Ostinati
- Slight changes over time to become more complex (changes in dynamics, rhythms, adding notes to a melody etc.
- Building layers of sounds to create a thicker texture
- Using multiple rhythms at the same time

Listening Examples Steve Reich 'Clapping Music' - https://www.youtube.com/watch?v=QNZQzpWCTIA Philip Glass 'Music for 18 Musicians' - https://www.youtube.com/watch?v=PMsYuFrKUQ8 Daniel Bernard Roumain 'Metamorphosis' - https://www.youtube.com/watch?v=m3KDUCfAeHE&list=PLpTG9WYImrmVzxzJlkPUbQtPFyCfSOS9P Videos BBC 'Tones, Drones and Arpeggios' An interview with Philip Glass - https://www.bbc.co.uk/programmes/p05zf7xn

KEY WORDS AND MEANINGS (Tier 2 words in ORANGE, Tier 3 words in BLUE)	
Ostinati	Musical repetition
Counterpoint	Melodies that are against other melodies (played at the same time)
Polyrhythms	Many rhythms played at the same time
Looping	When referring to old fashioned tape recorders – you literally loop a piece of tape so it repeats the music over and over
Phasing	When two melodies or rhythms go out of synch and back in synch again
Minimalism	A style in music that is repetitive, has gradual changes and is hypnotic
Static Harmony	Groups of notes that do not change much
Synchronisation	Bringing sounds together at the correct time
Motif/cell	A short melody/musical idea
Metric Displacement	Moving a melody to another part of the beat

ENGLISH – THE GREAT DEBATE

Literacy / key words

Devastating (highly destructive or damaging)

Controversial (causing disagreement or discussion)

Alarmingly (worryingly)

Severity (how bad or serious something is)

Crisis (a time of intense difficulty or danger)

Stigma (a set of negative or unfair beliefs a society has about something)

Stereotype (a widely held but fixed or oversimplified image of someone or something)

Prejudiced (showing an unreasonable dislike for something or someone)

Perpetual (something that never stops)

Which vocabulary can you use to move your speech along?

At the beginning: Firstly, primarily, I'd like to begin with, to start with...

To build your argument: Furthermore, on top of this, in addition to, moreover...As a result...

To bring in a counter argument: It could be argued... although some may disagree... understandably, sometimes... outrageously, some say...

To finish: In conclusion... Finally...To sum up...In summary...

The 5 S's.

Stride: Walk to the platform with energy and purpose.

Stand: Don't distract your audience in the first instance by moving around- get them to focus on you.

Smile: It relaxes you and helps you engage with the audience.

Speak: Be ready to start speaking- you are in control

Stay: When you have finished, look around, nod or smile and take applause before leaving the stage.

Persuasive techniques:

Tick these off as you use them.

- **Direct address**-using words like 'you' to the audience.
- **Alliteration-** repeating the same starting letters for effect.
- **Rhetorical Question-** a question that is not expected to be answered.
- **Facts and statistics-** e.g. 1 in 10 of us, 30 000 people...
- **Anecdote-** a personal story.
- **Expert opinion-** a quote from a doctor, professor etc.
- **Figurative language-** use metaphors, similes etc for effect.
- **Repetition**- repeating a word or phrase for effect.
- **Rule of 3-** Using three words in a list for effect.
- **Emotive language-** Words that create an emotive response.

Extra - Read/watch/do

- Make sure that your cue cards are prepared and ready
- Practice reading your speech to a friend or family member
- Watch the video for advice on delivering a speech: https://www.youtube.com/watch?v=-qx8uAUwZYk

You will be assessed on

The content of your speech and structure of your argument/DAFOREST features

Your body language and tone of voice

Links to curriculum

- Oracy skills
- Etymology
- Persuasive writing skills

ENGLISH – THE GREAT DEBATE

Literacy / key words

Discriminatory (making an unfair distinction between two groups of people)

Violence (actions intended to hurt people or cause damage)

Abusive (treating someone badly or cruelly)

Substantial (of considerable importance or size)

Witness (as a verb, telling someone to watch something)

Nonsensical (something that doesn't make sense)

Disturbing (causing anxiety, worrying)

Atrocious (horrifyingly wicked)

Deliberate (done on purpose)

Reaction (a response to something)

Nationally (around the nation)

Political (relating to the government)

Topical (something relevant, of interest)

Successful ways to open a speech…

- Quote

Opening with a relevant quote can help set the tone for the rest of your speech. *E.g. "Yesterday is not ours to recover, but tomorrow is ours to win or lose."*

- "What If" Scenario

Immediately drawing your audience into your speech works wonders. Asking a "what if" question invites the audience to follow your thought process. *E.g. What if you woke up every morning, cold, shivering on the street?*

- "Imagine" Scenario

A similar method, but more relevant for sensational examples. It puts your audience members directly into the presentation by allowing each member to visualize an extraordinary scenario. *E.g. Imagine a world where everybody was treated equally…*

- Question

Ask a rhetorical or literal question. *How would you feel if you had to walk ten miles every morning…?*

- Statistic

Use a surprising, powerful, personalized statistic that will resonate with the audience to get your message across right away *e.g. 1 in 2 people get cancer…*

- Powerful Statement/Phrase

A statement or phrase can catch the audience's attention by keeping them guessing as to what you're about to say next. *E.g. half of the world's coral reef has been destroyed in the last 30 years.*

How to structure the rest of your speech?

1)Begin by explaining the points you will make. *E.g. Today, I will be sharing with you…*
2)Begin your first argument, using a range of persuasive devices. *Firstly, can you believe that…*
3)Bring in a shocking fact for your audience to remember. *E.g. Shockingly, a startling 60 %..*
4)Introduce a counter argument. *E.g. while many may argue that…*
5)Bring in another argument. *Furthermore…*
6)Bring In one final argument. *As a result…*
7)Conclude by really emphasising your personal view. *E.g. in conclusion, the main thing I want you to remember is…*

ENGLISH – THE GREAT DEBATE

English

Literacy [Key Words]

- **Ranch**: a large farm.
- **Migrant workers**: people who moved around to find jobs.
- **Exploitation**: abuse of somebody, particularly when they are in need.
- **Marginalisation**: excluding somebody from a group or from society.
- **Segregation**: separating people based on the colour of their skin.
- **Scapegoat**: a group that are blamed for things that are not their fault.
- **Bindle**: a bag or sack to carry belongings.
- **Bucking Barley**: to pick up grain, bag it and load it onto a truck.
- **Ostracism/ostracise**: rejecting someone

Historical Context [AO3]:

- Of Mice and Men is set in California, America in the 1930s.
- An estimated 1.3 million people moved to California during this time in the hopes of finding work resulting in a lack of jobs for everyone.
- **The Great Depression 1929 – 1939**: a global economic crash which led to the loss of millions of jobs, people were homeless, starving to death and being exploited.
- **The Dust Bowl 1930-1940**: droughts and dust storms swept across America, the lack of water led to farmers being unable to grow enough crops and their land deteriorating. Farmers were unable to feed even their own families and often ended up in debt trying to grow crops for the country.
- **Life for African-Americans in the 1930s**: racism increased in America again during this time as people were looking for a <u>scapegoat</u> for their problems. Violence and hatred towards African-Americans rose with organisations like the KKK growing in number.
- Racial <u>segregation</u> remained and black Americans were forced to attend different schools, use different transport, restaurants, toilets, drinking fountains and public places. These were maintained by the Jim Crow Laws.
- Around 50% of all African-Americans were unemployed by 1932 due to racism and the Great Depression.
- The American Dream: the idea that America was a place where all your dreams could come true and you would be successful and prosperous.
- **Disability**: disabled people lived a hard life, they were often <u>marginalised</u> and excluded from society – people didn't understand learning disabilities and therefore shunned those with these illnesses.






<u>Extra - Read/watch/do:</u>

- Watch the *Of Mice and Men* (1992) film.
- Revise using BBC Bitesize.

<u>You will be assessed on:</u>

- A QTA response to an extract studied previously in class.

<u>Links to curriculum:</u>

- History (A03): The Great Depression, Feminism/Sexism, Workers' Rights, and Disability.
- Religious Studies: Ethics and Morality.

English

Sentence Starters:

Steinbeck presents the character/ theme of… through _____

For example, "…"

This _____ is effective as…

It makes the reader understand/realise/question/ feel…

Additionally, it also has the effect that…

Steinbeck has presented this character/theme in this way to…

The use of the word (aim to use specific word class), "…" implies…

It also has connotations of…

Overall, this represents life in 1930s America because…

It is an effective example of how….. was at this time as it shows…

AO1 / AO2 / AO3

Add your own quote on the underlined section:

Chapter 1:

- Animal imagery about Lennie: "snorting into the water like a horse", "he dabbled his big paw in the water"
- Imperatives - George to Lennie: "give it here", "hide in the brush till I come for you"
  _____
- Juxtaposition: "I got you to look after me, and you got me to look after you."

Chapter 2:

- Light symbolism: "the morning sun threw a bright dust-laden bar through one of the side windows", "the rectangle of sunshine was cut off."
- Repetition/colloquial language: "Curley's like a lot of little guys. He hates big guys. He's alla time picking scraps with big guys. Kind of like he's mad at 'em because he ain't a big guy."
- Colour connotations: _____

Chapter 3:

- Repetition: "he just scared her. I'd be scared too if he grabbed me."
- Personification: "the silence fell on the room again. It came out of the night and invaded the room." (Candy's dog is about to be killed).
- Emotive language: "Candy went on excitedly", "this thing they had never really believe in was coming true."
  _____
- Imperatives, George to Lennie: "Get him, Lennie. Don't let him do it", "Leggo of him Lennie. Let go."

Chapter 4:

- Repetition: "I ain't wanted in the bunkhouse and you ain't wanted in my room."
- Emotive language: "A guy needs somebody to be hear him. He whined, a guy goes nuts if he ain't got nobody."
  _____
- Rhetorical question: "Think I don't like to talk to somebody ever' once in a while?"

Chapter 5:

- Simile: "her body flopped like a fish."
- Repetition: "shoot him in the guts."
- _____

Chapter 6:

- Cyclical structure: "we gonna get a little place", _____

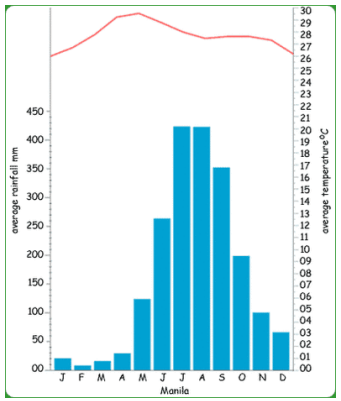
English

Geography Knowledge Organiser: Climate

Climate is the average atmospheric conditions over a long period of time e.g. Northern Africa is hot and dry, the UK is mild and wet.
It is not the same as weather, because weather is the day to day conditions, which can be very different over a short period of time.

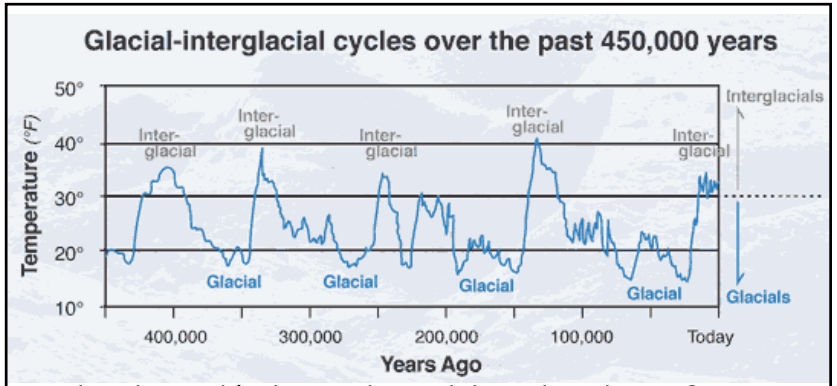
What factors affect out climate?

Latitude – it gets hotter the closer to the equator you are.
Altitude – it gets colder the higher up from sea level you are.
Prevailing winds – the direction the wind usually comes from has an impacts on the temperature and rainfall, depending if the wind has come from the land or sea, or from the equator or poles.
Air pressure – this causes air to rise or sink. In regions where air is usually rising (like the UK), moisture in the air cools and condenses to form rain clouds. In regions which usually have sinking air, for example the desert regions, clouds do not form, so it is dry.



Climate Graphs

Climate graphs show temperature and rainfall on one graph. The rainfall is displayed as blue bars, which are read off the left hand y axis. The temperature is displayed as a red line, which is read off the right hand y axis.



How has the Earth's climate changed throughout history?

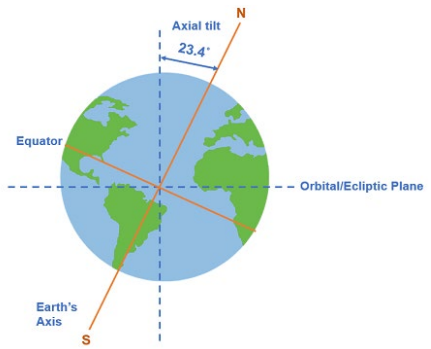
The Earth's average temperature has changed over the last 500,000 years. There are times when the global climate is warmer (interglacial phases) and times when it has been cooler (glacial phases), when there have been Ice Ages.
CO2 has risen more than 40% in just the past 200 years, contributing to human alteration of the Earth's temperature by about 1 °C. This speed of warming is more than ten times that at the end of an Ice Age, the fastest known natural sustained change on a global scale.

Assessment Skill

- Writing to **analyse**: Explain the importance of one thing over another, give evidence for your argument and explain thoroughly how this evidence proves your point.
- Writing to **evaluate**: weigh up the advantages and disadvantages equally, then come to a conclusion.

What are the causes of climate change?

Natural causes of climate change: The Earth is tilted on its axis. But the extent of tilting changes over the course of 41,000 years. When the Earth is more tilted the winters are far colder and the summers far warmer, which allows build-ups of ice to melt. However, when it is straighter, there is less seasonality with mild winters and summers that do not get as warm, this means that any ice that has built up over the winter does not melt, and it leads to Ice Ages.
Human causes of climate change: Deforestation is the mass clearance of forested areas. Globally, we destroy around ten million hectares of forest every year. The respiration of trees involves absorbing carbon dioxide and releasing oxygen. Therefore, we describe forests as a 'carbon sink'. When we remove forested areas less carbon can be absorbed and more remains in our atmosphere, trapping heat and causing global temperatures to rise.



What are the impacts of climate change?

More people likely to die from heat exhaustion e.g. UK 2022 over 4,500 deaths attributed to heatwave.
Rising sea levels will cause low-lying coastal areas to become inhabitable e.g. Tuvalu which is expected to be the first nation to be completely submerged within the next 50-100 years, leading to poverty, overcrowding on the island and increased emigration.
Melting land ice will lead to increased volume of water in the oceans as well as leading to increased global heating due to a loss of reflection of solar radiation from the ice. It is also leading to difficult living conditions for many species e.g. polar bears in the Arctic, and could lead to extinction.

History Knowledge Organiser

Topic 4: Holocaust and Genocide

Literacy / key words

Holocaust Term first used in the late 1950s to describe the systematic torture and murder of approximately six million European Jews and millions of other "undesirables"

Genocide deliberate destruction of a national, ethnic, racial, religious, or tribal group, in whole or in part.

Antisemitism Dislike or hatred of the Jews.

Arbeit Macht Frei "Work makes you free" is emblazoned on the gates at Auschwitz and was intended to deceive prisoners about the camp's function.

Aryan Term used by the Nazis to describe northern European physical characteristics (such as blonde hair and blue eyes) as racially "superior".

Concentration Camp Camps in which Jews were imprisoned by the Nazis. There were three different kinds of camps: transit, labour and extermination.

Final Solution Term used by the Nazis to describe their plan to annihilate the entire Jewish population of Europe.

Pogrom An organized attack on a group of people.

Timeline: Persecution of the Jewish community

Scan the QR code to watch a short clip on Jewish persecution

1933

- The **SA** organised a **boycott** of Jewish shops and businesses.
- Books by Jewish authors were publicly burnt.
- Jewish civil servants, lawyers and teachers were sacked, and Jewish doctors and dentists could not treat **Aryans**.
- Science lessons about race were introduced which **taught that Jews were subhuman.**

1934

- Jewish shops were marked with a **yellow star.**
- Jews had to sit on separate seats on buses and trains. Many councils banned them from public spaces.

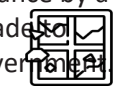
1935

- The **Nuremberg Laws** stripped Jews of German citizenship, outlawed marriage and sexual relations between Jews and Germans, and removed all the civil and political rights of the Jews. These laws were to be the foundation for much of the extreme persecution which took place later.

1938

- Jews were ordered to register all wealth and property.
- Jews were forced to change their first names: males would be known as Israel, females as Sarah.

- **Kristallnacht** - *9 November* (The Night of Broken Glass). The **SS** organised attacks on Jewish homes, businesses and synagogues in retaliation for the assassination of the German ambassador to France by a Jew. During Kristallnacht, 400 synagogues and 7,500 shops were destroyed. Jews were then made to clear up the destruction on their hands and knees and pay a fine of one billion marks to the government. The remaining Jewish property was then confiscated.



1939

- The Nazis, who had been encouraging Jews to emigrate from 1933 onwards, now started "forced" emigration.

Who were the key figures in the Holocaust?

dolf Hitler leader of the Nazi arty. He was a **great orator** ublic speaker) who ypnotised his audiences. In his writings and speeches talked of destroying the Jewish race and passed laws against Jewish people. His **anti-Semitic beliefs** and policies were implemented soon after the Nazis came to power. He believed the **Aryan race** to be superior.

leinrich Himmler was the **lead of the SS**. He was in verall charge of the **'Final olution'** and believed that he as carrying out **Hitler's instructions to exterminate the Jews**. He made sure news about camps were secret; and had **propaganda** films made showing how well Jews were being treated.

erman people of all jobs and ackgrounds saw the **Jews ere being treated differently** nd **did not protest**. Many had ven **stopped buying goods** at **Jewish stores**. Only a **small number** of German people **stood up for the Jews**.

Extra - Read/watch/do

The Holocaust extended vocabulary list: https://hmh.org/education/resources/vocabulary-terms-related-holocaust/

What is genocide?: https://www.hmd.org.uk/learn-about-the-holocaust-and-genocides/what-is-genocide/

You will be assessed on:

Jewish life before the Nazis, Persecution in Germany, the Nuremberg Laws, Kristallnacht, the Final Solution

Links to curriculum:

RE – the Jewish faith/antisemitism

Geography – the countries involved or affected by the Holocaust and/or genocide

History Knowledge Organiser

Topic 4: Holocaust and Genocide

Who was Anne Frank?

- Jewish Anne Frank hid in 1942 from the Nazis in the attic of a house in Amsterdam.
- Anne and her family went into hiding to avoid Nazi persecution after the Nazis invaded the Netherlands, where Anne lived.
- Two years later she was discovered. In 1945 she died in the Bergen-Belsen concentration camp.
- **Anne** is famous for keeping a diary of her experiences.

What were the death camps?

All over the world, Auschwitz has become a symbol of terror, genocide, and the Holocaust. The Germans isolated all the camps and sub-camps from the outside world and surrounded them with barbed wire fencing. All contact with the outside world was forbidden.

Who was on Hitler's persecution list?

- Jewish people
- Gypsies (Sinti and Roma)
- Disabled people
- Homosexuals
- The 'Rhineland Bastards' (African/German heritage)
- Jehovah Witnesses
- **THE ASOCIALS**: anti-Nazis, communists, trade unionists, the homeless, prostitutes, alcoholics
- Hitler played on fears that one day Germans would be outnumbered by inferior peoples

What happened during the Rwandan genocide?

'Leave none to tell the story'

In 1994, members of the **Hutu ethnic majority** in central African nation of **Rwanda murdered** as many as **800,000** people, mostly of the **Tutsi minority**. Started by **Hutu nationalists** in the capital of Kigali, the **genocide** spread throughout the country with shocking **speed and brutality**, as ordinary citizens were encouraged to take up arms against their neighbours. By the time the Tutsi-led Rwandese Patriotic Front gained control of the country through a military offensive in early July, hundreds of **thousands of Rwandans were dead** and **2 million refugees fled Rwanda**.

What happened during the Cambodian Genocide?

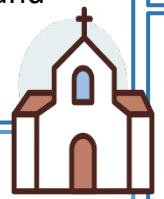
Millions of **Cambodians** were **murdered** by the **Khmer Rouge**. The Khmer Rouge were **led by Pol Pot** and held **radical totalitarian beliefs**. They wanted to create a classless, rural, agricultural society where personal property, currency, religion and individuality did not exist. **People associated** in any significant way with the **previous government**, **religion**, or **education** were **targeted for persecution**, imprisonment, torture and murder. Some Cambodians were also **exploited as forced labourers** by the regime and died as a result of over-work and malnutrition. Ineffective rulers and their economic mismanagement caused significant **shortages of food and medicine**. Hundreds of thousands of **Cambodians began to die** from **hunger** caused by the **famine** and **treatable diseases** such as malaria .

Religion and Ethics Knowledge Organiser

YEAR 9 Sacred Spaces

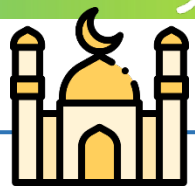
What is the importance of Sacred Spaces?

Sacred spaces are important for both religious and non-religious people. For religious people, these places are where they go to **worship, connect with their faith, and be part of a community**. The art and symbols in these spaces help them understand their religion better. Non-religious people can appreciate sacred spaces for their **cultural and historical value, beautiful architecture**, and as **quiet places for reflection**. These spaces also host events support their local community and bring **people together, fostering understanding and shared values.**



Why are Churches important?

Churches are important for various reasons. They are places where people come together to **worship, find moral guidance**, and build a **supportive community**. Churches often organise charitable activities such as **food banks**, contributing to the well-being of the local community. Additionally, they mark important **life events** and serve as cultural and architectural landmarks, **preserving history** and providing **educational programs**. Churches play a role in shaping individuals' **spiritual journeys**, fostering a **sense of belonging**, and making positive contributions to society through acts of charity.



Why are Mosques important?

Mosques are crucial for Muslims as places of **worship** and **community gathering**. They provide spaces for **daily prayers**, **Friday congregations**, and educational programs, promoting spiritual growth and unity. Beyond religious duties, mosques engage in charitable activities, actively promoting the **principle of zakat**, where they **organise aid distributions**, **food drives**, and **community outreach**. They also offer a sense of **belonging among diverse Muslim communities**, encouraging shared values and collective well-being.

Why are Gurdwaras important?

A Gurdwara serves as a central place for **worship** and **community activities**. It embodies the Sikh principles of **equality**, **selfless service (sewa)**, and **community fellowship**. Sikhs gather at the Gurdwara to engage in **congregational prayers**, **listen to the Guru Granth Sahib**, and participate in the **langar**, a community kitchen that offers free meals to all, regardless of background. The concept of sewa, or selfless service, is integral to Gurdwaras, where volunteers work together to ensure the well-being of the community and extend assistance to those in need

Key words

Ritual: Planned actions or ceremonies done for religious or cultural reasons.
Community: A group of people living together and sharing common interests, values, and goals.
Sacred: Holy, blessed, or set apart for worship or reverence.
Numinous: The presence of a divine or spiritual quality that evokes awe and reverence.
Identity: The unique traits and features that make someone who they are.
Shared identity: Common characteristics, experiences, or values that bind a community together.
Diversity: Having different people in a group or community.
Charity: Providing help, support, or resources to those in need, often through acts of kindness and generosity.

Notre Damn – Why does it matter?

Notre Dame Cathedral in Paris which was erected in the 1345. It's a symbol of **France's history, art, and shared identity**. The cathedral's stunning architecture showcases the incredible skills of French craftsmen and contains important **religious relics** making it a **proud landmark that people around the world recognize**. When Notre Dame faced a **fire in 2019**, people from around the wold **raised money to save the building**. Many people supported the effort, however some **people criticised the fund raising effort** stating that the money would be better spent looking after **people who are struggle or homeless.**

Religion and Ethics Knowledge Organiser

What makes a good argument?

When we study **Philosophy**, we will be studying a range of arguments, so it is important that we know how to recognise a 'good' argument.

A good argument is **valid** and **effective**. It uses evidence and logic and avoids using **fallacies.**

Some of the common fallacies are:

Ad Hominem – Critiquing the person, not the argument.

Tu Quoque – The 'you too' argument.

Appeal to Authority – Using someone of authority to back your argument, instead of evidence.

Appeal to Emotion – Manipulating the emotions of the other.

What does Plato say about the nature of our existence?

Plato was an ancient Greek philosopher who is considered a foundational thinker in Western philosophy.

Plato considered the nature of our existence and argued that there are two realms:

The Realm of Appearances: A realm in which we can only see mere shadows or reflections of true reality (where we exist).

The Realm of Forms: A realm where one can experience the true form of objects.

Plato uses the **Analogy of the Cave** to explain this concept.

YEAR 9 Philosophy: Thoughts that have changed the world

What does Descartes say about the nature of our existence?

René Descartes was a French philosopher, mathematician and scientist. He was a logical thinker who questioned the nature of our existence by '**doubting**'.

Descartes believed that it is impossible to gain knowledge through **empiricism.** This means that we cannot trust our senses because it could be an illusion and it could trick us.

Descartes also says that there is a possibility that we are being tricked by an **Evil Demon!** This means that we can't even use **rationalism!** The demon could trick us – e.g. 2 + 2 might actually = 5!

Descartes concludes that we can only know one thing for sure: that I exist. This is where the famous quote "**cogito ergo sum**" ("I think, therefore I am") comes from.

What does Marx say about our society?

Karl Marx was a German-born philosopher, political theorist, economist, sociologist, journalist and socialist – a busy man! He is most famous for the theory of **Communism.**

Marx believed that the **capitalist** system led to workers becoming disconnected and **alienated** from four things:

The product – workers have no control over what they make; it belongs to someone else.

The process – workers have no say in how they work, often doing boring/repetitive tasks.

The self – working under a capitalist system stops people to reach their full potential.

Others – workers are always in competition with others. This leaves them disconnected.

Marx argued that we should adopt a **communist** system where everyone works together and shares resources equally so that everyone's needs are met. It sounds good! But does it work in practice? There are lots of pros and cons to consider.

Key words

Empiricism: The theory that all knowledge is based on experience and information gathered through the senses.

Rationalism: The theory that reason (thinking things through) rather than experience is how we gain knowledge.

Fallacy: A mistaken belief, especially one based on unsound arguments

Communism: A type of government as well as an economic system in which the government or the whole community owns property and land, and everyone is supposed to share the wealth that they create.

Verification: The verification principle is like a rule or idea used in philosophy to help us decide if something is meaningful or not

Falsification: It suggests that for a theory to be considered scientific, it must be able to be tested and conceivably proven false.

Eschatological Verification: Eschatological verification describes a process whereby a proposition can be verified after death.

What is worth discussing?

The Verification Principle is a philosophical idea that says, "A statement only makes sense if you can prove it's true or false". To prove something, you need **empirical evidence** (evidence from our experiences) and **rational evidence** (logical proof, like maths).

The Falsification Principle is a philosophical idea that says, "A statement only makes sense if there is a way to prove it false". For example, "it will rain tomorrow" is meaningful because if it doesn't rain, it is false. "Invisible fairies control the weather" is not meaningful because there is no way to show it is wrong.

Eschatological Verification is an idea that challenges this principle by saying, "Some things can only be proven true or false after we die or at 'the end of time'". For example, a statement like "Heaven exists" can't be tested now, but if you die and find out, it can be proven to be true.

GRAPHS LINEAR AND QUADRATIC EQUATIONS

Key Concepts

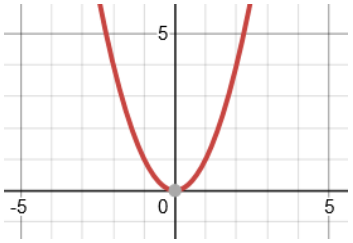
Straight line graphs always have the equation:

$$y = mx + c$$

m is the **gradient** i.e. the steepness of the graph.

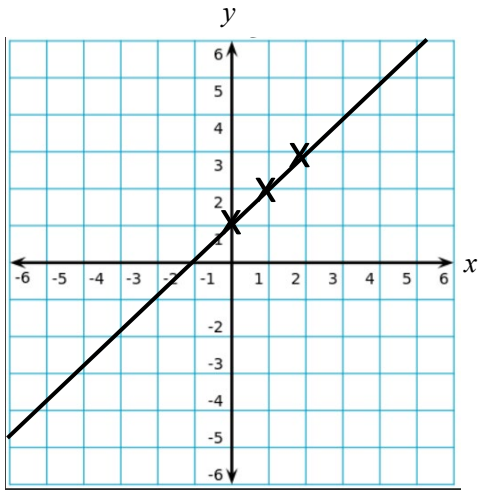
c is the **y intercept** i.e. where the graph cuts the y axis.

A **quadratic** graph will always be in the shape of a parabola.

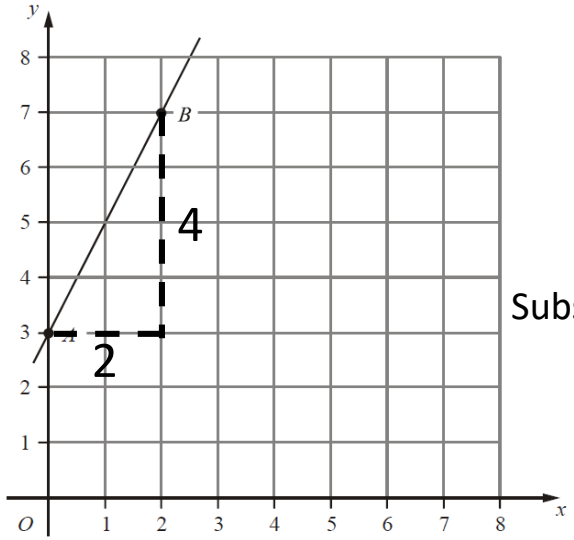


Plot the graph of $y = x + 1$

x	0	1	2
y	1	2	3



Examples



Calculate the equation of this line:

$$y = mx + c$$

$$m = \frac{4}{2}$$

$$= 2$$

$$y = 2x + c$$

Substitute in a coordinate: (2,7)

$$7 = (2 \times 2) + c$$

$$3 = c$$

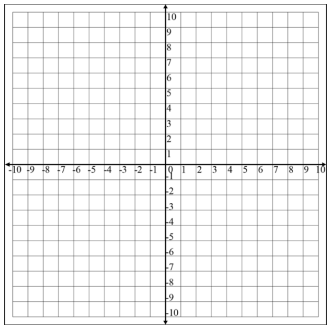
$$y = 2x + 3$$

Key Words

Coordinate
Gradient
Quadratic
Y-intercept **Roots**
Turning-point
Solution

Extra - Read/watch/do

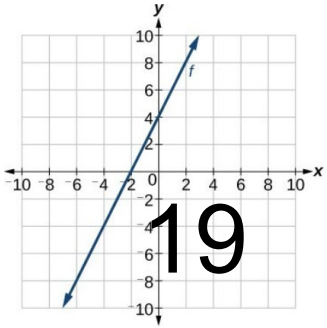
Links to curriculum



1) Plot the line $y = 3x - 2$

2) Find the equation of the line for the attached graph.

ANSWERS: 2) $y = 2x + 4$

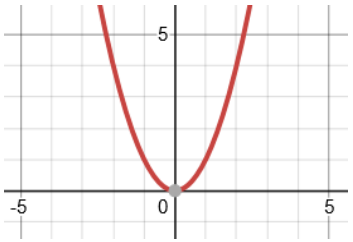


QUADRATIC GRAPHS

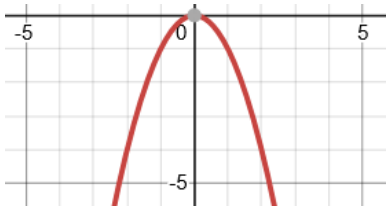
Key Concepts

A quadratic graph will always be in the shape of a parabola.

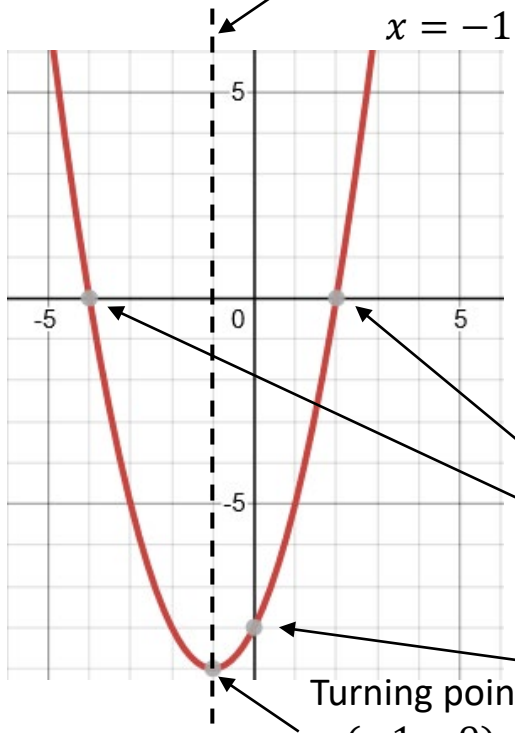
$y = x^2$



$y = -x^2$



The roots of a quadratic graph are where the graph crosses the x axis. The roots are the solutions to the equation.



Examples

$$y = x^2 + 2x - 8$$

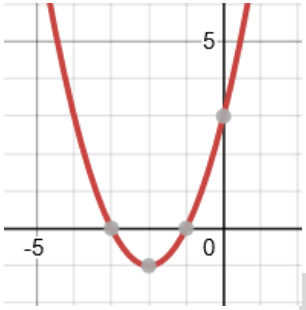
A quadratic equation can be solved from its graph.
The roots of the graph tell us the possible solutions for the equation. There can be 1 root, 2 roots or no roots for a quadratic equation. This is dependant on how many times the graph crosses the x axis.

Key Words

Quadratic
Roots Intercept
Turning point
Line of symmetry

Extra - Read/watch/do

Links to curriculum



Identify from the graph of $y = x^2 + 4x + 3$:

1) The line of symmetry
2) The turning point
3) The y intercept
4) The two roots of the equation

20

ANSWERS 1) $x = -2$ 2) $(-2, -1)$ 3) 3 4) $x = -1$ and -3

PERCENTAGE CHANGE AND REVERSE PERCENTAGES

Key Concepts

Calculating percentages of an amount without a calculator:

10% = divide the value by 10
1% = divide the value by 100

Calculating percentages of an amount with a calculator:

Amount × percentage as a decimal

Calculating percentage increase/decrease:

Amount × (1 ± percentage as a decimal)

Percentage change:

A dress is reduced in price by 35% from £80. What is it's **new price**?

$Value \times (1 - percentage\ as\ a\ decimal)$
$= 80 \times (1 - 0.35)$
= £52

A house price appreciates by 8% in a year. It originally costs £120,000, what is the **new value** of the house?

$Value \times (1 + percentage\ as\ a\ decimal)$
$= 120{,}000 \times (1 + 0.08)$
= £129,600

Reverse percentages: This is when we are trying to find out the original amount.

A pair of trainers cost £35 in a sale. If there was 20% off, what was the **original price** of the trainers?

$Value \div (1 - 0.20)$
$= 35 \div 0.8$
= £43.75

A vintage car has increased in value by 5%, it is now worth £55,000. What was it worth **originally**?

$Value \div (1 + 0.05)$
$= 55{,}000 \div 1.05$
= £52,380.95

Examples

Key Words
Percent
Increase/decrease
Reverse
Multiplier
Inverse

Extra - Read/watch/do

Links to curriculum

1a) Decrease £500 by 6%
b) Increase 70 by 8.5%
2) A camera costs £180 in a 10% **sale**. What was the **pre-sale** price
3) The cost of a holiday, including **VAT** at 20% is £540. What is the **pre-VAT** price?

ANSWERS A 1a) £470 b) £75.95 2) £200 3) £450

TYPES OF ANGLE AND ANGLES IN POLYGONS

Key Concepts

Regular polygons have equal lengths of sides and equal angles.

Angles in polygons

Sum of interior angles

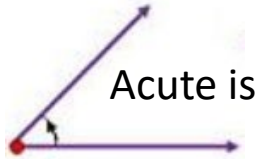
$= (number\ of\ sides - 2) \times 180$

Exterior angles of **regular** polygons $= \frac{360}{number\ of\ sides}$

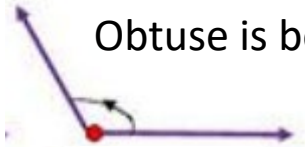
Types of angle

There are four types which need to be identified – acute, obtuse, reflex and right angled.

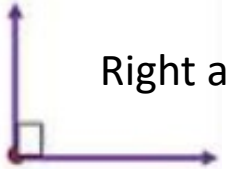
Examples



Acute is less than 90°



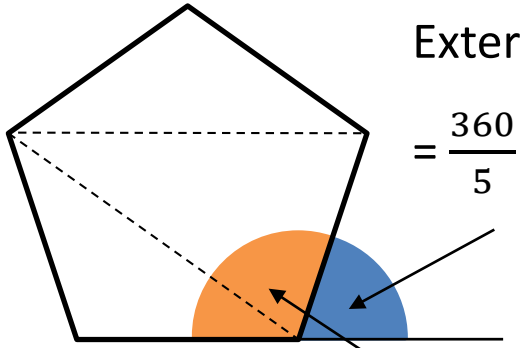
Obtuse is between 90° and 180°



Right angled is 90°

Reflex is between 180° and 360°

Regular Pentagon



Exterior angles

$= \frac{360}{5} = 72^o$

Sum of interior angles

$= (5 - 2) \times 180$

$= 540^o$

Interior angle =

$\frac{540}{5} = 108^o$

Key Words

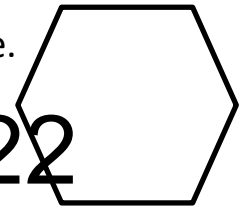
Polygon
Interior angle
Exterior angle
Acute
Obtuse
Right angle
Reflex

Extra - Read/watch/do

Links to curriculum

Questions

1) Calculate the sum of the interior angles for this regular shape.
2) Calculate the exterior angle for this regular shape.
3) Calculate the size of one interior angle in this regular shape.

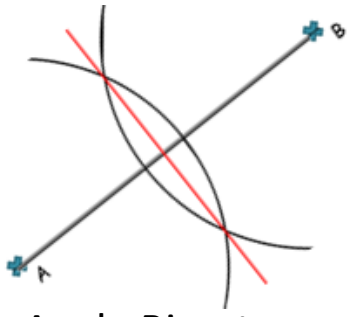


ANSWERS: 1) 720° 2) 60° 3) 120°

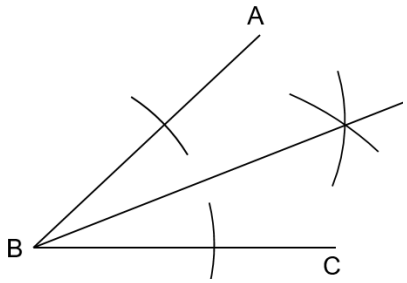
CONSTRUCTIONS

Key Concept

Line Bisector



Angle Bisector



Key Words

Construction: To draw a shape, line or angle accurately using a compass and ruler.
Loci: Set of points with the same rule.
Parallel: Two lines which never intersect.
Perpendicular: Two lines that intersect at 90°.
Bisect: Divide into two parts.
Equidistant: Equal distance.

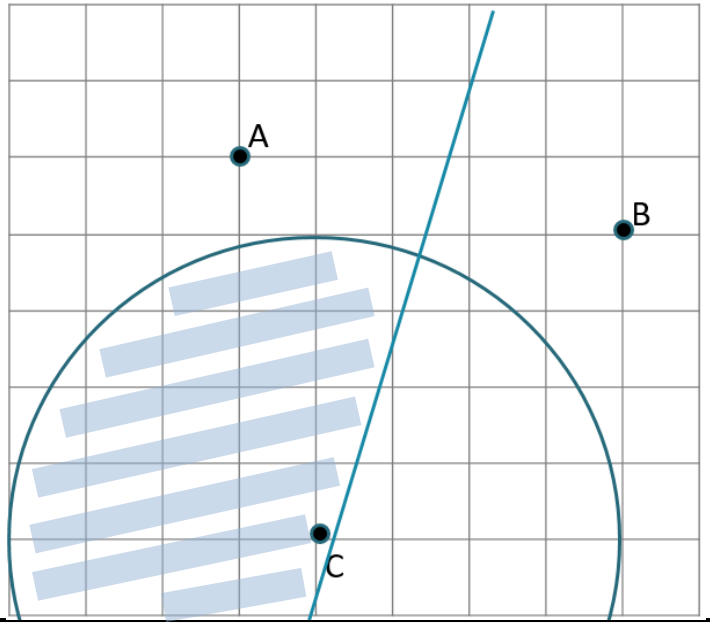
Examples

Shade the region that is:

- closer to A than B
- less than 4 cm from C

Line bisector of A and B

Circle with radius 4cm



Tip

Watch for scales.
For a scale of:
1 cm = 4 km.
20 km = 5 cm
6 cm = 24 km

Extra - Read/watch/do

Links to curriculum

Questions

1) Draw these angles then bisect them using constructions:
a) 46° b) 18° c) 124°
2) Draw these lines and bisect them: a) 6cm b) 12cm

MFL Knowledge Organiser Yr9 French

Spring 2

1. **Il y a** – there is / are
2. **c'est** – it is **ça sera** – it will be
3. **sont** – (they)are **seront** – they will be
4. **a - has**
5. **ont – (they) have**

T – Present tense: regular verbs

PRESENT	-er verbs	-ir verbs	-re verbs
je / j'	port-e	-s	-s
tu	port-es	-is	-s
Il/elle/on	port-e	-it	-
Nous	port-ons	-issons	-ons
Vous (pl)	port-ez	-issez	-ez
Ils or elles	port-ent	-issent	-ent

O

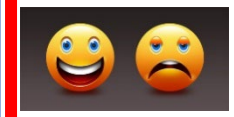
je trouve que
je pense que
je crois que
je dirais que
à mon avis

- selon moi =
according to me
- selon mon copain
- selon mes parents

Opinions & Pronouns – P

ÇA OR CELA …. **me** fascine **OR** **me** plaît **OR**

m'intéresse **OR** **m'**amuse OR **me** rend content[e]



CELA or ça m'énerve

CELA or ça m'ennuie

CELA/ ça me fâche [angers me]

Connectives / frequencies – C

alors /donc	*so, therefore*
car / parce que	*because*
dernier/dernière	*last*
beaucoup (de)	*a lot (of)*
d'abord	*first of all*
ensuite	*next*
après	*afterwards*
finalement/enfin	*finally*
aujourd'hui	*today*
hier [soir/matin]	*yesterday [eve./morning]*
avant-hier	*the day before yesterday*
(mardi) dernier	*last (Tuesday)*

T – How to form the future tense with ALLER… 1 2 3

- You will need to remember one easy formula:

1 subject	+	2 present tense of aller	+	3 infinitive
Je		vais		manger
Tu		vas		jouer
il / elle / on		va		faire
Nous		allons		regarder
Vous		allez		finir
ils/elles		vont		aller

Future time indicators

demain =
ce week-end=
le week-end prochain=
l'année prochaine=
l'été prochain=

Complexity - comparisons – C

PLUS petit[e] QUE: smallER THAN
MOINS beau QUE: LESS handsome THAN
LE PLUS jeune : THE youngEST
LA MOINS gentille : THE LESS kind
LES PLUS/ MOINS…: THE MOST/ THE LEAST

Adjectives – A

beau/belle – beautiful
moche - ugly
démodé – old fashioned
à la mode: fashionable
pratique – handy
(in)confortable – (un)comfortable
élégant / chic elegant
horrible – horrible
coloré – colourful

des vêtements de marque – branded clothes
le style/look gothique – the Gothic look
le style/look décontracté – the casual look
le style/look BCBG – the posh look
mon vêtement préféré, c'est… - my favourite item of clothing is
blanc(he)(s) - white
noir(e)(s) - black
rouge(s) - red
vert(e)(s) - green
gris(e)(s) – grey
marron – brown
jaune(s) - yellow
bleu(e)(s) – blue
orange(s) - orange

LES VÊTEMENTS

1. un bonnet: hat
2. un imperméable
3. a raincoat
4. un jean: jeans
5. un survêtement: tracksuit
6. un short: shorts
7. un maillot de bain: a bathing suit
8. un T-shirt – a t-shirt
9. Un pantalon: trousers
10. des bottes - boots
11. des gants - gloves
12. des lunettes (de soleil) – (sun)glasses
13. une casquette – a cap
14. une chemise – a shirt
15. une robe – a dress
16. une veste – a jacket
17. une jupe – a skirt
18. une écharpe a scarf

Qu'est-ce que tu portes ?							
Quand je vais à l'école (When I go to school) **Quand je joue au foot** (When I play football) **Quand je suis avec mes amis** (When I am with my friends) **Le weekend** (At the weekend) **La semaine** (During the week) **Si je pouvais** (If I could) **Si j'avais le choix** (If I had the choice) **Hier** (yesterday)	**je porte** (I wear/ I m wearing) **j'aime porter** (I like to wear) **je peux porter** (I can wear) **je dois porter** (I must wear) **Je voudrais porter** (I would like to wear) **Je porterais** (I would wear) **J'ai porté** (	**un t-shirt** (a t-shirt) **un maillot de bain** (a bathing suit) **un pantalon** (trousers) **un short** (shorts) **un uniforme scolaire** (a school uniform)	**bleu** (blue) **rouge** (red) **gris** (grey) **blanc** (white) **noir** (black)				**confortable** (comfortable) **pratique** (handy) **beau** (nice) **joli** (pretty) **à la mode** (fashionable) **moche** (ugly) **horrible** (horrible) **démodé** (old-fashioned) **nul** (rubbish)
		une jupe (a skirt) **une chemise** (a shirt) **une veste** (a jacket) **une cravate** (a tie)	**bleue** (blue) **rouge** (red) **grise** (grey) **blanche** (white) **noire** (black)	**et** (and) **mais** (but) **cependant** (however)	**je pense que** (I think that) **je trouve que** (I find that) **à mon avis** (according to me) **selon moi** (according to me)	**c'est** (it is)	
		des baskets (F-PL) (trainers) **des chaussures (F-PL)** (shoes) **des chaussettes (F-PL)** (socks-)	**bleues** (blue) **rouges** (red) **grises** (grey) **blanches** (white) **noires** (black)				

MFL Knowledge Organiser

O — Là où j'habite

Spring 2

T

il y avait	*there was/were*
était: was	*c'était it was*
Ils/ elles étaient	*they were*
Je voudrais/ j'aimerais habiter/vivre	
I would like **to live**	

PAST

Perfect Tense

Subject	Avoir	Past participle
J'	ai	Take off ending from infinitive:
Tu	as	
Il/elle	a	-er verbs = é
Nous	avons	-ir verbs = i
Vous	avez	-re verbs = u
Ils/elles	ont	

Perfect Tense

Subject	Être	Past participle
Je	suis	Take off ending from infinitive:
Tu	Es	-er verbs = é
Il/elle	Est	-ir verbs = i
Nous	Sommes	-re verbs = u
Vous	Êtes	**Agreement of PP
Ils/elles	sont	(f) + e
		(pl) +s
		(f+pl) + es

IRREGULAR verbs with avoir

J'ai eu: I had
J'ai bu: I drank
J'ai vu: I saw
J'ai lu: I read
J'ai fait: I did
J'ai dit: I said
J'ai écrit: I wrote

Subject	The IMPERFECT tense	
J'/ Je	habitAIS/ vivAIS	I USED TO live
Tu [SING]	J'habitAIS/ vivAIS	You USED TO live
Il/elle/ on	habitAIT/ vivAIT	He/she/ weUSED TO live
Nous	habitIONS/ vivIONS	We USED TO live
Vous [PLUR]	habitIEZ/ vivIEZ	you USED TO live
Ils/elles	habitAIENT	They USED TO live

Opinions & Pronouns

P

me fascine **ça/cela**

me plaît	m'énerve
m'amuse	m'ennuie
m'intéresse	me fâche (angers me)
me rend content(e)	me rend triste

Connectives / Sequencers

C

alors /donc	*so, therefore*
car / parce que	*because*
d'abord	*first of all*
ensuite	*next*
après	*afterwards*
finalement	*finally*
trop	*too*
assez/très	*quite /very*
un peu	*a little /a bit*
vraiment	*really*
incroyablement	*incredibly*

Complexity

C

plus...que more ...than
moins...que less...than
aussi...que as...as
LE /LA /LES PLUS + ADJECTIF - the most___

Adjectives

A

C'est comment? What is it like?

C' est/ il est/ elle est. *It is*
Je trouve que c'est **OR** qu'il est **OR** qu'elle est…

petit(e)(s)	*small*
grand(e)(s)	*big*
beau(x)/ belle(s)	*beautiful*
joli(e)(s)	*pretty*
vieux/vielle(s)	*old*
nouveau/nouvelle	*new*
neuf[s]/ neuve[s]	*new*
moderne(s)	*modern*
confortable(s)	*comfortable*
gros(se)(ses)	*big (for objects)*
calme[s]/tranquille[s]	*quiet*
bruyant(e)(s)	*noisy*

TIF –
1. **Selon moi**
2. **Selon mon copain..**
3. **je dirais que**
4. **À mon avis..**

Adjectives placed before the noun	
vieux/vieille	old
nouveau/nouvelle	new
beau/belle	beautiful
grand(e)	big
petit(e)	small
joli(e)	pretty

J'habite dans une **VIELLE** maison qui est **MOINS** confortable **QUE** la maison de ma grand-mère.

1

Où habites-tu?
Where do you live?

A. WHERE I LIVE

J'habite à	I live in
une ville	a town
une grande ville	a city
à la campagne	in the countryside
à la montagne	in the mountains
au bord de la mer	at the seaside
près de la plage	near to the beach
près de l'autoroute	near the motorway
dans la banlieue de la ville	on the outskirts of town
une maison jumelle	a semi-detached house
une grande maison	a big house
une petite maison	a small house
un appartement	a flat
une ferme	a farm

2

C. DANS LA VILLE

la patinoire	the ice rink
la piscine	the swimming pool
le stade	the stadium
la discothèque	the disco
le port	the port
le bateau	the boat
la fôret	the forest
la mairie	the town hall
la galerie d'art	the art gallery
la gare routière	the bus station
la bibliothèque	the library
le centre commercial	the shopping centre
le centre de loisirs	the leisure centre
le collège	the school
le commissariat	the police station
l'église (f)	the church
la gare (SNCF)	the station
l'hôpital	the hospital
les magasins	the shops

3

ooms of the house

le bureau	office
la cave	cellar
la chambre	bedroom
la cuisine	kitchen
le grenier	attic
le jardin	garden
la pièce	room
la salle à manger	dining room
la salle de bains	bathroom
la salle d'eau	wet room
le salon	living room
le séjour	
le sous-sol	basement
le rez-de-chaussée	ground floor

4

Furniture

l'armoire	wardrobe
la bibliothèque	bookcase
le bureau	desk
le canapé	sofa
la chaise	chair
la commode	chest of drawers
l'étagère	shelf
le fauteuil	armchair
la fenêtre	window
le lit	bed
les meubles	furniture
le miroir	mirror
la peinture	painting
la porte	door
le tapis	rug

5

Adjectives placed before the noun

vieux/vieille	old
nouveau/nouvelle	new
beau/belle	beautiful
grand(e)	big
petit(e)	small
joli(e)	pretty

6

Adjectives placed after the noun

chèr(e)	expensive
dur(e)	hard
propre	clean
agaçant(e)	annoying
douillet(te)	cosy
sombre	dark
animé(e)	lively
calme	quiet
historique	historic
touristique	touristic
artisanal(e)	hand-made
bon marché	cheap
fermé(e)	closed
gratuit(e)	free
ouvert(e)	open
pratique	practical
de taille moyenne	medium-sized
tard	late
tôt	early
bruyant(e)	noisy
sale	dirty

MFL Knowledge Organiser

French

Spring 2 ra

T

1. **Il y avait** – there was/were
2. **étai**t – was **c'était** – it was
3. **étaient** – were **c'étaient** – they were
4. **Il avait** – he had
5. **Ils avaient** – they had

Perfect Tense

Subject	Avoir	Past participle
J'	ai	Take off ending from infinitive: • **-er verbs = porté/ habité** • **-ir verbs = i** • **-re verbs = u**
Tu	as	
Il/elle	a	
Nous	avons	
Vous	avez	
Ils/elles	ont	

Perfect Tense

Subject	Être	Past participle
Je	suis	Take off ending from infinitive: **-er verbs = é** **-ir verbs = i** **-re verbs = u** ****Agreement of PP** **(f) + e** **(pl) +s** **(f+pl) + es**
Tu	es	
Il/elle	Est	
Nous	Sommes	
Vous	êtes	
Ils/elles	sont	

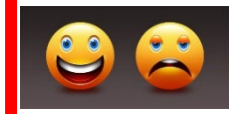
Irregular verbs with "avoir" parts

bu: drank
dit: said
écrit: wrote
eu: had
fait:did
lu: saw
pris: took
vu: saw

DR. & MRS. VANDERTRAMP

Opinions & Pronouns

ÇA OR CELA …. **me** fascine **OR** **me** plaît **OR** **m'**intéresse **OR** **m'**amuse OR **me** rend content[e]



CELA or ça m'énerve

CELA or ç m'ennuie

CELA/ ça me fâche [angers me]

Connectives / frequencies

alors /donc	*so, therefore*
car / parce que	*because*
dernier/dernière	*last*
beaucoup (de)	*a lot (of)*
d'abord	*first of all*
ensuite	*next*
après	*afterwards*
finalement/enfin	*finally*
aujourd'hui	*today*
hier [soir/matin]	*yesterday [eve./morning]*
avant-hier	*the day before yesterday*
(mardi) dernier	*last (Tuesday)*

Complexity

PLUS petit[e] QUE: smallER THAN
MOINS beau QUE: LESS handsome THAN
LE PLUS jeune : THE youngEST
LA MOINS gentille : THE LESS kind
LES PLUS/ MOINS…: THE MOST/ THE LEAST

CONDITIONAL

Je/j'	habiterais	I would live
Tu	habiterais	You would like/ would you live
Il/elle/on	habiterait	Il/she/ spoken we would live
Nous	habiterions	We would live
Vous	habiteriez	You (plural) would live
Ils	habiteraient	They would live
elles	habiteraient	They would live

1. **Mon** jardin est **PLUS** petit **QUE** ton jardin/ or **le tien**.
2. Ma maison est **BIEN PLUS** grande que ta maison/ or la tienne.
3. Les monuments ÉTAIENT beaux.

Science Knowledge Organiser

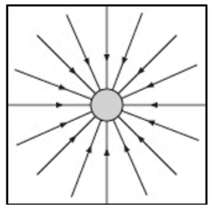
Physics GCSE Transition

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 breezes occur	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

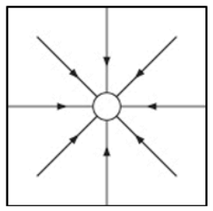
2. Fields

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



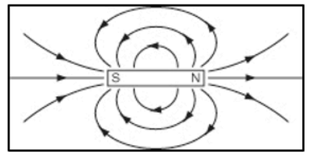
The arrows show the direction a positive charge would move

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

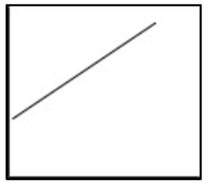
Calculating gravitational potential energy	Gravitational potential energy (in J) = mass (in kg) × height (in m) × gravitational field strength (in N/kg)

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

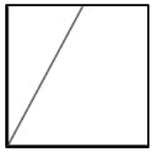
4. Links Between Variables

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

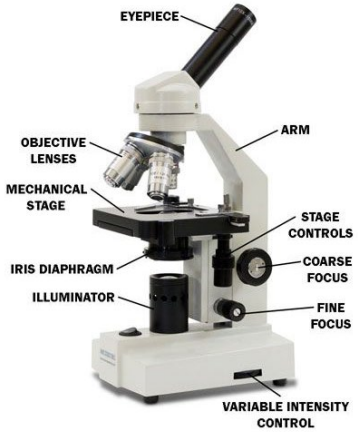
What models can be used for	To help us understand how things work; to test new technology
Abstract model	A model that only exists in your thoughts or as a computer program, formula or diagram
Physical model	A model that you can touch or a model that you could build e.g., wind tunnel

B1: Biology key concepts

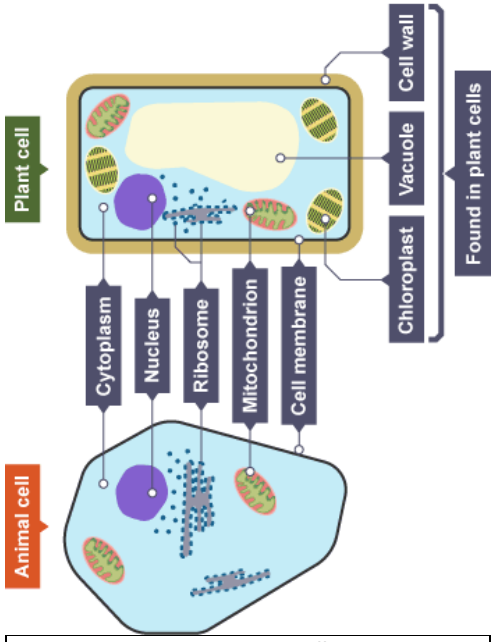
Lesson sequence

1. Microscopes
2. Plant and animal cells
3. Measuring cells
4. Core practical: using microscopes
5. Specialised cells
6. Bacterial cells
7. Digestive enzymes
8. How enzymes work
9. Factors affecting enzymes
10. Core practical: enzymes and pH
11. Cell transport
12. Core practical: osmosis in potatoes

1. Microscopes	
***Magnification**	The number of times bigger something appears under a microscope.
***Eyepiece lens**	The lens on a microscope that you look through.
***Objective lens**	The lens at the bottom of a microscope. There are normally three you can choose from.
***Total magnification**	Eyepiece lens x objective lens.
****Resolution**	The smallest distance between two points so that they can still be seen as two separate points.
****Stains**	Dyes added to microscope slides to show the details more clearly.
****Milli**	Thousandth, $1x10^{-3}$ (a millimetre is a thousandth of a metre).
****Micro**	Millionth, $1x10^{-6}$ (a micrometre is a millionth of a metre).
****Nano**	Billionth, $1x10^{-9}$ (a nanometre is a billionth of a metre).
****Pico**	Trillionth, $1x10^{-12}$ (a picometre is a trillionth of a metre).



2. Plant and animal cells	
***Cell**	The basic structural unit of all living things (the building blocks of life).
***Parts of an animal cell**	Cell membrane, cytoplasm, nucleus, ribosomes, mitochondria.
***Parts of a plant cell**	Cell membrane, cytoplasm, nucleus, ribosomes, mitochondria, cell wall, permanent vacuole, chloroplasts.
***Cell membrane**	Controls what enters and leaves the cell.
***Cytoplasm**	A jelly-like substance where chemical reactions take place.
***Nucleus**	Contains DNA and controls the cell.
***Ribosome**	Produces proteins.
***Mitochondria**	Releases energy by aerobic respiration.
***Cell wall**	Protects and supports the cell, made of cellulose.
***Permanent vacuole**	Stores sap and helps to support the cell.
***Chloroplast**	Where photosynthesis happens, contains chlorophyll.

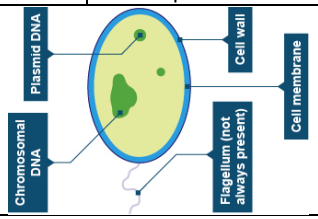


3. Measuring cells	
***Micrograph**	A picture produced by a microscope.
***Light microscope**	A microscope that uses light, can magnify up to 1500 times.
****Electron microscope**	A microscope that uses electrons to produce an image, can magnify up to 1,000,000 times.
****Actual size of a cell**	Actual size = measured size / magnification
****Convert mm to µm**	Micrometres (µm) = millimetres (mm) x 1000

4. Core practical – using microscopes (CP1)	
***CP1 – key question**	What do cells look like under a light microscope?
***CP1 – Prepare the slide**	Collect the cells you are studying and place them on the slide. Add a drop of stain and cover with a cover slip.
***CP1 – Select lens**	Choose between the 4x, 10x and 40x objective lenses.
***CP1 – Place slide in microscope**	Place slide on microscope stage, adjust the coarse focus until the lens is just touching the slide.
***CP1 – Rough focus**	Looking through the eyepiece, slowly adjust the coarse focus until you see a rough image.
***CP1 – Fine focus**	Looking through the eyepiece, slowly adjust the fine focus until you see a sharply focussed image.
***CP1 – Record the image**	Draw what you see, label any cell parts you can recognise and repeat with different objective lenses.
***CP1 - Results**	As you increase the magnification of the objective lens, the cells appear larger and more detailed.

5. Specialised cells	
****Small intestine cell**	**Job:** To absorb small food molecules produced during digestion. **Adaptations:** Tiny folds called microvilli that increase their surface area.
****Sperm cell**	**Job:** Fertilise an egg and deliver male DNA. **Adaptations:** A tail to swim, mitochondria to give energy for swimming, an acrosome to break through the egg's jelly coat, haploid nucleus with only half the total DNA.
****Egg cell**	**Job:** To be fertilised by a sperm and then develop into an embryo. **Adaptations:** Jelly coat to protect the cell, many mitochondria and nutrients to provide energy for growth, haploid nucleus with only half the total DNA.
****Ciliated epithelial cell**	**Job:** To clear mucus out of your lungs (and other internal surfaces). **Adaptations:** Small hairs on the surface – called cilia – which wave to sweep mucus along.

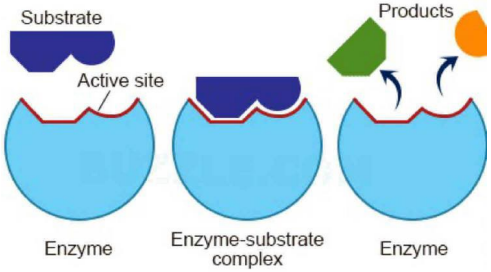
6. Bacterial cells	
***Parts of a bacterial cell**	**All bacteria:** Cell membrane, cell wall, cytoplasm, ribosomes, chromosomal DNA, plasmid DNA **Some bacteria:** flagellum.
****Chromosomal DNA**	Large piece of DNA containing most genes.
****Plasmid DNA**	Small loops of DNA containing a few genes.
****Flagellum**	A tail used for movement.
****Eukaryotic cells**	Cells with a nucleus.
****Prokaryotic cells**	Cells without a nucleus.
***Standard form**	A way of writing numbers in terms of powers of ten. E.g. $0.015 = 1.5 \times 10^{-2}$ $0.000458 = 4.56 \times 10^{-4}$ The index of ten (the 'minus' number) tell you which decimal point to start on.



7. Digestive enzymes	
***Digestion**	Breaking large food molecules down into ones small enough to absorbed by the small intestine.
***Catalyst**	A substance that speeds up a chemical reaction without being used up.
***Enzyme**	A protein that works as a catalyst to speed up the reactions in our cells.
***Digestive enzymes**	Enzymes that break large food molecules down into smaller ones.

****Amylase**	**Where found:** saliva, small intestine **What it does:** breaks down starch into simple sugars such as maltose
****Lipase**	**Where found:** small intestine **What it does:** breaks down fats into fatty acids and glycerol
****Protease**	**Where found:** stomach (pepsin), small intestine (trypsin) **What it does:** breaks down proteins into amino acids

8. How enzymes work	
***Substrate**	The chemical(s) that an enzyme works on.
***Active site**	An area of an enzyme with the same shape as the substrate.
****Lock and key mechanism**	The substrate moves into the active site and reacts to form the products. The products leave the active site so another substrate can then enter and so on.
****Specificity**	Each enzyme can only work on one substrate because the shape of the active site has to match.
***Denature**	When the shape of the active site changes shape so the enzyme stops working.



9. Factor affecting enzymes	
***Optimum temperature**	The temperature when an enzyme works fastest (about 37^{O} for human enzymes).
****Changing the temperature**	**Increasing to optimum**: rate increases because particles move faster **Increasing past optimum:** rate decreases as enzyme denatures

***Optimum pH**	The pH when enzymes work fastest (around pH 6-8 for most human enzymes)
****Changing pH**	Rate decreases as you move away from the optimum because the enzyme denatures.
****Increasing substrate concentration**	At first the rate increases, but then it levels out as the enzyme is working as fast as possible.

10. Core practical – enzymes and pH (CP2)	
***CP2 – key question**	How does the rate that amylase works change as you change the pH?
***CP2 – Prepare your reactants**	Place starch solution, amylase solution and pH 7 buffer into separate test tubes and warm them in a water bath at $40^{o}C$
***CP2 – Prepare your dropping tile**	Place a few drops of iodine solution into each well of a spotting tile.
***CP2 – Start the reaction**	Mix reactants together, start the stop watch and keep the mixture warm in the water bath.
***CP2 – Test for starch**	Remove a small amount of mixture and place in a well on the spotting tile.
***CP2 – Record your results**	Repeat the test until the mixture does not go black (no starch). Record the time.
***CP2 – Vary the pH**	Repeat with different pH buffers from pH 3 to pH 10
***CP2 – Results**	The amylase works fastest around pH 7 and more slowly at pH high or lower than this.

11. Cell transport	
***Concentration**	The number of particles in a given volume (the strength of a solution).
****Concentration gradient**	The difference in concentration between two neighbouring areas.
***Diffusion**	The movement of particles from high to low concentration (down a concentration gradient).

***Diffusion examples**	**Lungs:** oxygen into blood, carbon dioxide out of blood **Leaf:** carbon dioxide into leaf, oxygen out of leaf.
****Partially permeable membrane**	A membrane that allows some molecules but not others to pass through it (like a cell membrane).
****Osmosis**	The movement of water across a partially permeable membrane from high water/low solute conc to low water/high solute conc.
****Osmosis examples**	Water into plant roots, water in/out of any cells.
***Active transport**	Using energy to move substances from low to high concentration (up a concentration gradient).
***Active transport examples**	Minerals being absorbed into plant roots.

12. Core practical – osmosis in potatoes (CP3)	
***CP3 – Prepare potatoes**	Cut six similar pieces of potato, blot them dry and weigh them.
***CP3 – Run the experiment**	Place each potato piece in a test tube with sucrose (sugar) solutions with concentrations from 0% to 50%
***CP3 – Record results**	Blot each potato piece dry and re-weigh it.
***CP3 – Calculate percentage mass change**	% change = (final value – starting value) / starting value x 100
***CP3 – Results**	Potato in weaker sucrose solutions gain mass because water enters potatoes by osmosis, those in stronger solutions lose mass as water leaves by osmosis

B2: Cells and control

Lesson sequence

1. Mitosis
2. Animal growth
3. Plant growth
4. Stem cells
5. Nervous system
6. Neurotransmission
7. Controlling movement

1. Mitosis	
***Cell cycle**	The life of a cell comprising interphase and mitosis.
***Interphase**	Preparation for mitosis in which extra cell parts are made and DNA chromosomes are replicated (copied).
***Mitosis**	When one cell divides into two genetically identical daughter cells.
***(I)PMATC**	The stages of mitosis: interphase (not mitosis), prophase, metaphase, anaphase, telophase, cytokinesis.
****Prophase**	The membrane of the nucleus breaks down and spindle fibres start to form.
****Metaphase**	Spindle fibres fully form and chromosomes line up across the middle of the cell.
****Anaphase**	Chromosome copies separate and move to each end of the cell.
****Telophase**	A new membrane forms around each set of chromosomes to form two nuclei.
****Cytokinesis**	The two new cells fully separate.
***Cancer**	When mitosis happens out of control forming large lumps of cells called tumours.

2. Animal growth	
***Growth**	Increase in size due to increased numbers of cells.
***Percentile**	A measure of the growth of a child that compares them to other children of the same age.
***90th percentile**	A child is taller than 90% of children of the same age.
***50th percentile**	Average for height/mass for the age.
***Percentile graphs**	Graphs showing how height/mass change with age with different lines for each percentile.
***Cell differentiation**	When a cell divides by mitosis to produce two different types of cell (not two identical ones).
***Specialised cell**	A cell special features designed for a specific job.
****Importance of differentiation in animals**	To produce all the different types of cell the body needs such as red blood cells, fat cells, nerve cells and muscle cells.

3. Plant growth	
***Plant growth**	Cell division creates more cells, elongation makes these cells get bigger.
****Meristems**	Areas just behind the tips of roots and shoots where cell division and differentiation happens.
****Importance of differentiation in plants**	To produce all the different types of cell a plant needs such as root hair cells and xylem cells.
****Calculating percentage changes**	% change = (final value – starting value) / starting value x 100

4. Stem cells	
***Stem cell**	A cell that can differentiate when it divides, to produce two different cells.
****Embryonic stem cell**	A stem cell that can become any kind of cell. Found in developing embryos.
****Adult stem cell**	A stem cell that can only become a few types of cell. Found in animals after birth.
***Stem cells in medicine**	It is hoped they can be used to replace damaged cells in diseases like type 1 diabetes or leukaemia, or to grow new organs for transplant.
****Problems with stem cells**	They may potentially cause cancer, stem cells can only be used in the person they have come from.

5. Nervous system	
***Nervous system**	All the nerves in your body working together to gather information, make decisions and control responses.
***Central nervous system**	The brain and spinal cord – makes decisions (aka CNS).
****Peripheral nervous system**	All your other nerves – gathers information from your sense and carries messages from the CNS to your muscles.
***Neurone**	A nerve cell
***Impulse**	Electrical message carried by a neuron.
****Cell body**	The central part of a nerve cell containing its nucleus.
****Dendron and axon**	The long parts of a nerve cell carrying impulses towards the cell body (dendron) and away from it (axon)
****Myelin sheath**	A fatty layer around the axon and dendron that insulates it to prevent the impulse from escaping and speeds the impulse up.

6. Neurotransmission	
****Neurotransmission**	The travelling of an impulse along a neuron and into another.
****Dendrites**	Branches at the beginning of a dendron that connect to receptor cells or another neuron.
****Axon terminals**	Branches at the end of an axon that connect to a muscle or another neuron.
****Synapse**	Small gap between two neurons where the axon terminals of one meet the dendrites of another.
****Neurotransmitter**	Chemicals released by axon terminals that diffuse across the synapse to trigger a new impulse the dendrite of another neuron.
****Sensory neuron**	Nerve cell that carries impulses from sense organs to the CNS. Has a long dendron and a long axon.
****Relay neuron**	Nerve cell in the CNS that makes decisions. Dendrites join onto cell body, short axon.
****Motor neuron**	Nerve cell that carries impulses from the CNS to muscles. Dendrites join onto cell body, long axon.

7. Controlling movement	
***Stimulus**	A piece of information detected by the nervous system.
***Receptor**	Cells that detect a stimulus.
***Response**	The action that the nervous system makes happen.
***Effector**	The body part that produces the response, often a muscle.
****Voluntary movement**	A stimulus is detected by a receptor, causing an impulse to be carried by a sensory neuron to the brain. Relay neurones in the brain decide what to do and send another impulse down a motor neuron to the effector (muscle) to cause a response.
***Reflexes**	Automatic responses that happen very quickly without conscious thought to keep the body safe.
****Reflex arc**	Movement is caused in the same way as for voluntary movement, except the spinal cord makes the decision without needing the brain to think.

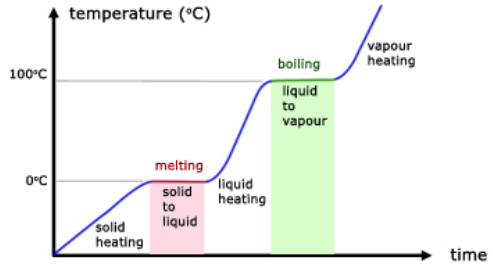
C1 & 2: States of matter and separating substances

Lesson sequence

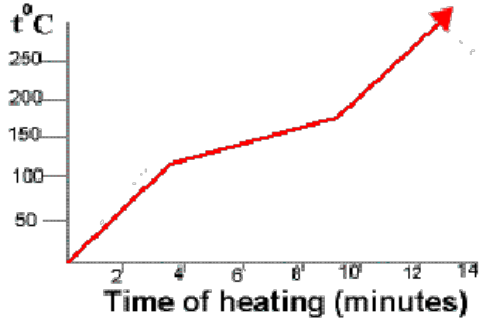
1. States of matter
2. Mixtures
3. Filtration and crystallisation
4. Paper chromatography
5. Distillation
6. Core practical – investigating inks (CP7)
7. Drinking water

1. States of matter	
***Particle**	The tiny pieces that all matter is made from.
***Atom**	The smallest independent particle. Everything is made of atoms.
***Molecule**	A particle made from two or more atoms bonded together.
***State of matter**	Whether a substance is solid, liquid or gas.
***Particle model**	A theory that uses the idea of particles to explain the differences between solids, liquids and gases.
***Solid**	**Particle arrangement:** Regular pattern, touching each other. **Particle movement:** Vibrating around a fixed point.
***Liquid**	**Particle arrangement:** Random, touching each other. **Particle movement:** Moving around
***Gas**	**Particle arrangement:** Random **Particle movement:** Moving quickly
***State changes**	Solid to liquid = melting Liquid to solid = freezing Liquid to gas = evaporating or boiling Gas to liquid = condensation Solid to gas = sublimation Gas to solid = deposition

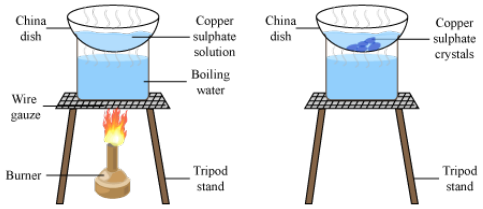
****Heating curve for a pure substance**	Temperature rises as you heat a solid, levels out as it melts, continues rising once fully liquid, levels out whilst boiling and rises again once fully gas.



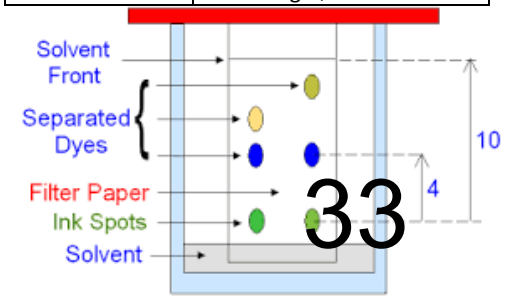
2. Mixtures	
***Element**	A substance made from only one type of atom.
***Compound**	A substance made from two of more different elements bonded together.
***Mixture**	A substance made of two of more substances (elements or compounds) mixed but not bonded together.
****Melting point of mixtures**	Mixtures do not melt at a fixed temperature but melt gradually over a range of temperatures.
****Heating curves of mixtures**	The flat sections of the heating curves of a pure substance are sloped for a mixture.



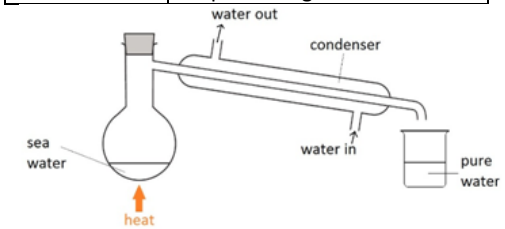
3. Filtration and crystallisation	
***Dissolve**	When a substance mixes with a liquid by breaking down into individual particles (atoms or molecules).
***Soluble**	When a substance can be dissolved by a liquid.
***Insoluble**	When a substance can't be dissolved by a liquid.
***Filtration**	A method of separating a mixture of a liquid and an insoluble solid by passing it through a filter paper.
****Residue**	The solid that gets left behind in the filter paper.
****Filtrate**	The liquid that passes through the filter paper.
****How filtration works**	The filter paper contains many tiny holes. The water molecules are small enough to pass through the holes, the solid particles are too big and get trapped.
***Solution**	A mixture of a solute dissolved in a solvent.
****Solvent**	A liquid that has dissolved a substance, for example water.
****Solute**	A solid that has been dissolved, for example salt.
***Crystallisation**	A method of collecting the dissolved solid from a solution by heating it so that the solvent evaporates away.
****Risks of crystallisation**	As the solvent boils away, the hot solution can spit, so you should wear safety goggles to protect your eyes.

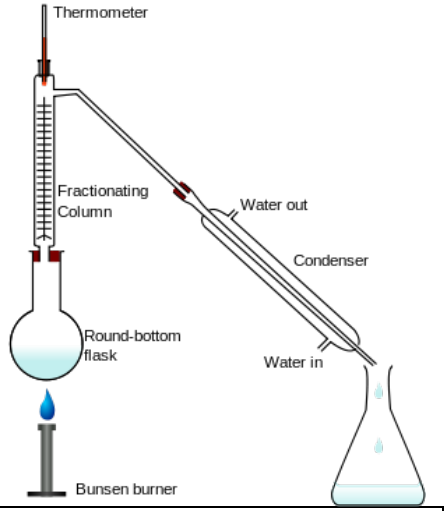


4. Paper chromatography	
***Paper chromatography**	A method of separating out mixtures of liquids to show what is in them, by letting them travel up a piece of chromatography paper.
***Chromatography method**	1. Draw pencil line on paper 2. Place sample spot on line 3. Place paper in solvent, with solvent below pencil line. 4. Allow solvent to soak up the paper 5. Stop when solvent near top, and mark how far it gets.
****Stationary phase**	The substance the solvent moves through – usually paper (Note: technically it is a thin layer of water from air that is bound to the paper molecules)
****Mobile phase**	The solvent.
****R_f (retardation factor)**	R_f = spot distance / solvent distance
****Uses of R_f**	R_f enables you to identify a substance because for a given solvent and stationary phases, it is unique to each substance.
****Uses of chromatography**	- To tell between pure and impure substances - To identify substances by comparison with known ones - To identify substances by calculating R_f.



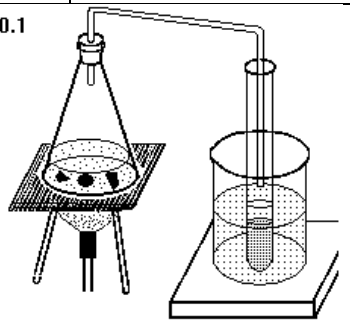
5. Distillation	
***Distillation**	A method used to collect pure liquid from a solution, such as getting pure water from seawater.
****Condenser**	A glass tube surrounded by a glass jacket containing cold tap water. Used to condense gases back to liquids.
****How distillation works**	The solution is heated until it is hot enough for the solvent to boil. The solvent is then passed through a cool condenser where it turns back to liquid. The solute does not get hot enough to evaporate and stays where it is.
****Anti-bumping granules**	Jagged grains of glass that are added during distillation to prevent violent boiling.
***Fractional distillation**	A type of distillation used to separate mixtures of two or more liquids.
****How fractional distillation works**	The liquid with the lowest boiling point boils first and can be collected, then the next boils and so on.
****Fractionating column**	A tall glass column used during fractional distillation that gives a better separation of the liquids by producing a temperature gradient.





6. Core practical – investigating inks (CP7)	
***CP7 – Aim**	To separate inks using distillation and chromatography.
***CP7 – Distillation set up**	Place some ink in a conical flask with a side arm and delivery tube attached, place the flask on a tripod above a Bunsen burner. Place a boiling tube in a beaker of ice and place the delivery tube into the boiling tube.
***CP7 – Run the distillation**	Light the Bunsen burner and allow the ink to boil, stop once a few drops of liquid have collected.
***CP7 – Distillation results**	Pure water collects in the test tube because it boils and the cold ice condenses the vapours back to liquid. The ink gets darker because there is less water to dilute it.
***CP7 – Chromatography setup**	1. Draw pencil line on paper 2. Place ink spot on line 3. Place paper in solvent, with solvent below pencil line. 4. Allow solvent to soak up the paper 5. Stop when solvent near top, and mark how far it gets.
***CP7 – Chromatography - calculate Rf**	Measure how far each of your spots has moved from the line and how far the solvent has moved. Rf = spot distance / sample distance.
***CP7 – Chromatography results**	The ink separates into multiple different spots. The one that moves furthest is most soluble in the water.

3.20.1



7. Drinking water	
***Potable water**	Water that is safe to drink.
***Desalination**	Producing pure water from seawater.
****Purifying seawater**	The seawater is distilled: heating the water to produce water vapour and condensing it back to liquid. Uses lots of energy.
****Uses of pure water**	Pure water has to be used when chemists analyse substances to fins out what they contain. Tap water contains many dissolved substances that could interfere with this.
****Water treatment in the UK**	Water is passed through a sedimentation tank, to allow sediment to settle out, it is passed through a filtration tower to remove floating particles, chlorine is added to kill bacteria.

C3 & 4: Atoms and the periodic table

Lesson sequence

1. Structure of atoms
2. Detailed structure of atoms
3. Isotopes
4. Mendeleev's periodic table
5. The modern periodic table
6. Electron configuration

1. Structure of atoms	
***Particle**	The tiny pieces that all matter is made from.
***Atom**	The smallest independent particle. Everything is made of atoms.
****Size of atoms**	About 1 x 10^{-10} m in diameter.
****Dalton's model of atoms**	- Tiny hard spheres - Can't be broken down - Can't be created or destroyed - Atoms of an element are identical - Different elements have different atoms
***Subatomic particles**	Smaller particles that atoms are made from.
***Proton**	Mass = 1 Charge = +1 Location = nucleus
***Neutron**	Mass = 1 Charge = 0 Location = nucleus
***Electron**	Mass = 1/1835 (negligible) Charge = -1 Location = shells orbiting nucleus
***Nucleus**	Central part of an atom, 100,000 times smaller than the overall atom

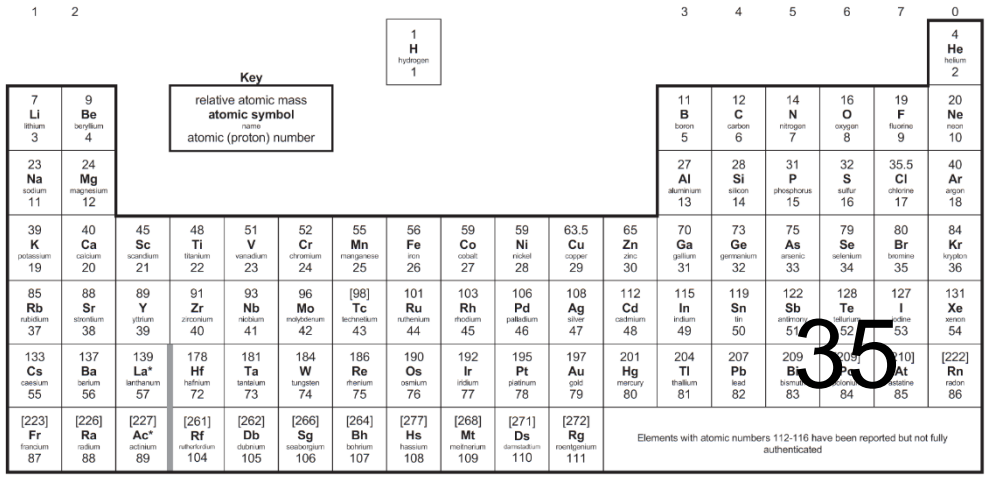
2. Detailed structure of atoms	
****Alpha particle**	Small positively charged particle made of two protons and two neutrons.
****Scattering**	When particles bounce back or change direction.
****Rutherford's experiment**	Fired alpha particles at gold leaf, used a phosphor-coated screen to track where they went.
****Rutherford's results**	Most alpha particles went through, some scattered (changed direction).
****Rutherford's explanation**	Scattered particles hit a solid nucleus. Most did not hit it, therefore nucleus is small
***Atomic number**	The bottom number on the periodic table, gives the number of protons and electrons.
***Atomic mass**	The top number on the periodic table, gives the total protons and neutrons together.
***Number of protons**	The atomic number.
***Number of electrons**	The atomic number.
***Number of neutrons**	Atomic mass minus atomic number.
***Number of protons and electrons**	Equal, because each negative electron is attracted to a positive proton in the nucleus.

3. Isotopes	
****Isotopes**	Atoms with the same number of protons but different number of neutrons.
****Describing isotopes**	Mass after the name (e.g. boron-10) or superscript mass before the symbol (^{10}B).
***Nuclear fission**	Large unstable atoms break into two smaller stable ones.
****Uses of fission**	Nuclear power, nuclear weapons.
****Relative atomic mass, A_r**	The weighted average of the masses of all of the isotopes of an element.
*****Isotopic abundance**	The percentage of an element that is made of a particular isotope.
*****Calculating A_r**	- Multiply each mass by the decimal % - Add these up **Note:** (decimal % = %/100)

4. Mendeleev's periodic table	
***Dmitri Mendeleev**	Russian chemist, developed the periodic table.
***Mendeleev's periodic table**	Ordered by increasing A_r, some elements switched according to their properties.
***Chemical properties**	Includes reaction with acid and formula of oxide.
***Physical properties**	Includes melting point and density.
****Gaps in Mendeleev's periodic table**	Mendeleev left gaps where no known element fitted and predicted these would be filled with newly discovered elements.
****Eka-aluminium**	An element that Mendeleev thought would fill a gap. He predicted its properties, which matched gallium when discovered.

5. The modern periodic table	
***Noble gases**	Gases that do not react: He, Ne, Ar, Kr.
****Moseley's experiment**	Fired electrons at samples of elements and measured X-rays produced.
****Moseley's results**	Energy of x-rays produced proportional to the positive charge of the element.
****Conc. from Moseley's work**	The atomic number must be the number of protons in the atoms.
****Pair reversals**	Elements (like Ar and K) that are not in order of increasing mass.
****Explaining pair reversals**	It means elements should be order elements by increasing atomic number instead.

6. Electron configuration	
***Shells**	Electrons orbit atoms in shells.
***First shell**	Holds up to two electrons.
***Second shell**	Holds up to eight electrons.
***Third shell**	Holds up to eight electrons.
***Number of electrons**	Given by the atomic number.
***Filling shells**	Fill shells from the first shell out. Move up a shell when current one is full.
***Electron configuration**	The number of electrons in each shell (e.g. Al is 2.8.3).
***Outer shell**	The last shell with any electrons in it.
****Groups**	Columns in the periodic table, tell you the number of electrons in the outer shell.
****Periods**	Rows in the periodic table, tell you the number of electron shells.

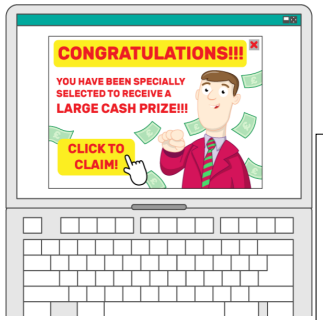


Computer Science Knowledge Organiser

CYBERSECURITY

Key words	
adware	adverts 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

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



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.

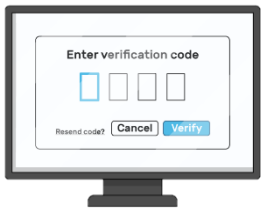
Computer Misuse Act 1990: It is an offence to:
1. have unauthorised access to computer material
2. have unauthorised access with intent to commit or facilitate the commission of further offences
3. commit unauthorised acts with intent to impair, or with recklessness as to impairing, the operation of a computer.

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.

Network and System **security measures** include:

Penetration testing
Anti-malware
passwords
User permissions
firewall
biometrics
User authentication
encryption
Auto updates



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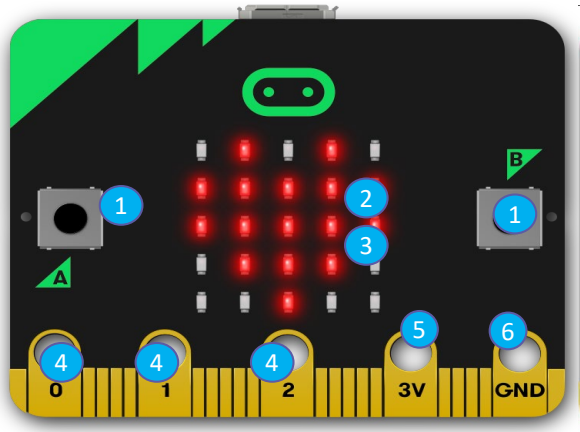
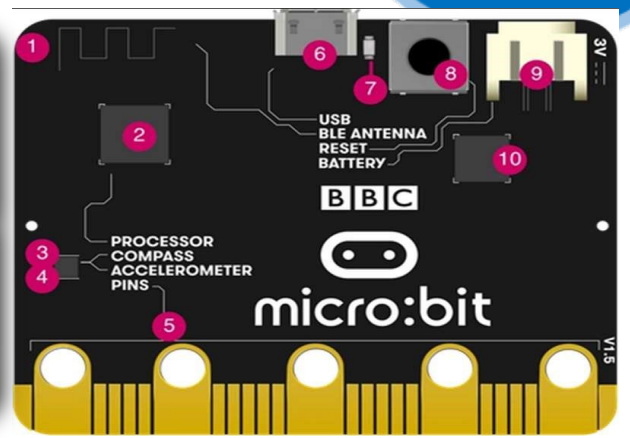
MICRO-BITS

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 AND THE WORLD OF WORK

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).

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

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

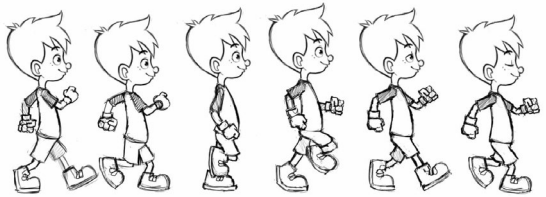
- Takes time to travel to and from the workplace
- Formal work wear
- Desks/workstations
- Labour-intensive tasks
- Slow communication
- Sociable
- 9-to-5 hours

Modern

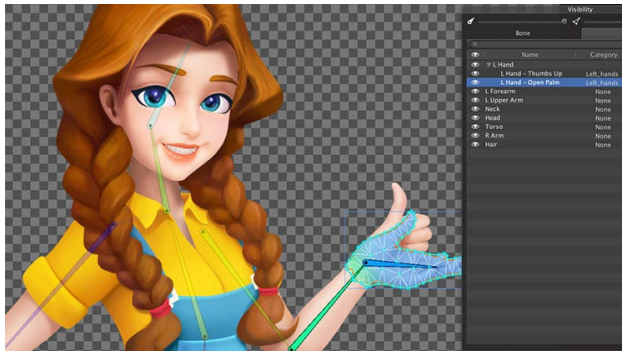
- Use of technology allows flexibility
- Teams can be local, national, or global
- Communication can be immediate
- Data/information is sent digitally and quickly
- Increased productivity
- Can be isolating

Computer Science Knowledge Organiser

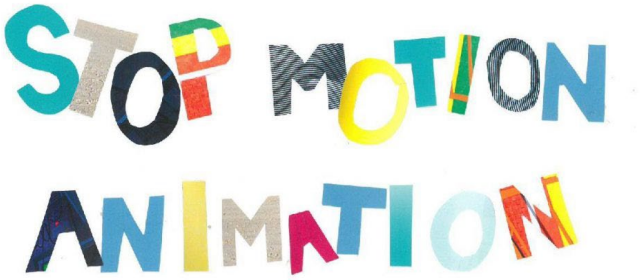
BLENDER - MEDIA ANIMATIONS



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



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 . CAD CAM

Literacy / key words

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

Renewable
energy comes from natural resources that are constantly replenished and never run out. These sources can be used repeatedly without depleting the Earth's supply.

Non-renewable energy comes from sources that will eventually run out because they are not replenished at the rate they are consumed

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

Non renewable energy	Advantages	Disadavatages
Coal	Produces high amounts of energy	Carbon dioxide produced when burned and mining damages the environment.
Gas	It emits less Co2 than coal . The UK has shale gas reserves .	Can cause water pollution ,
Oil	A small amount of oil can produce a lot of energy.	Creates significant air pollution when burned.

renewable energy	Advantages	Disadavatages
Wind turbines	Clean and cheap to run	Expensive to set up and wind does not always blow. Can be an eye sore .
Hydroelectric power stations	Clean and cheap to run	Expensive to set up and output could be affected by drought
Solar cells	Clean and cheap to run	Not always sunny

Extra - Read/watch/do

Watch and read
Who was Zaha Hadid

https://www.bbc.co.uk/bitesize/articles/zd48239#zqtsg2p

You will be assessed on

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

Links to curriculum

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

Design and Technology . CAD CAM

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
Age
Cost
Religion

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 vegan; avoid alcohol.

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

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 diary 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;.

Food Technology

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 seeds, olive oil and the recommended 5-a-day of fruit and vegetables.

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

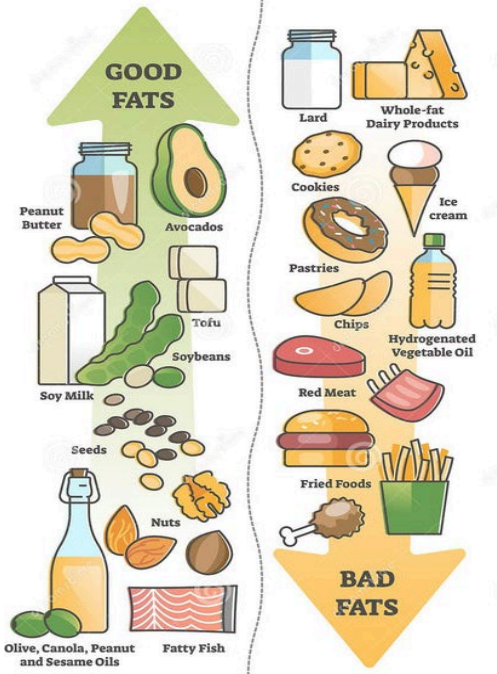
Iron is important in making red blood cells, which carry oxygen around the body. Iron deficiency anaemia results in the person affected feeling tired and lethargic because organs and tissues will not get as much oxygen as they need.

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

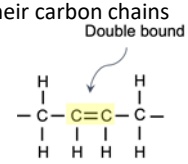
This is the term to describe a person who is very overweight, with a lot of body fat. It is a common problem in Western society. The method to determine if a person is overweight is to measure their BMI.

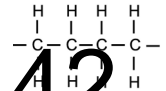
Nutrient Needs for Teenagers		
Nutrient	Reason	Examples of Foods
Protein	Cope with growth spurts. Boys muscular tissue development.	Omelettes chicken
Iron	Girls loose iron during menstruation and could become anaemic if not replaced. Vitamin C helps absorb iron	Spinach, beef
Vitamin C		Peppers, strawberries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



Unsaturated fatty acids contain at least one C=C bonds in their carbon chains

Saturated fatty acids only have single C-C bonds





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.

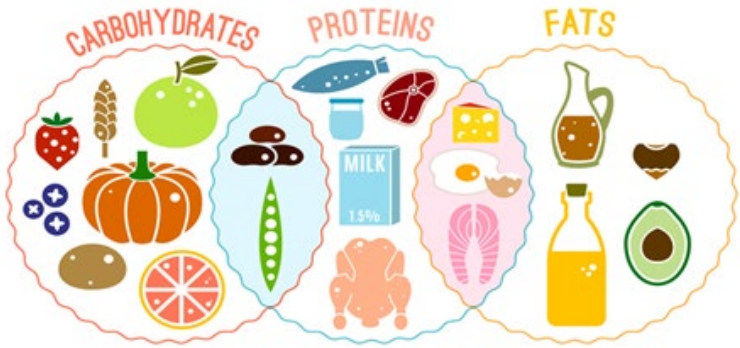
Glucose: or blood sugar, is the main source of energy for your body's cells, tissues, and organs.

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.

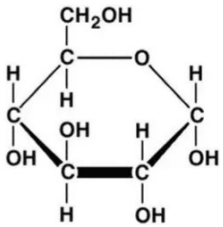
Gelatinisation: making a Roux Sauce

LOVE FOOD LOVE SCIENCE

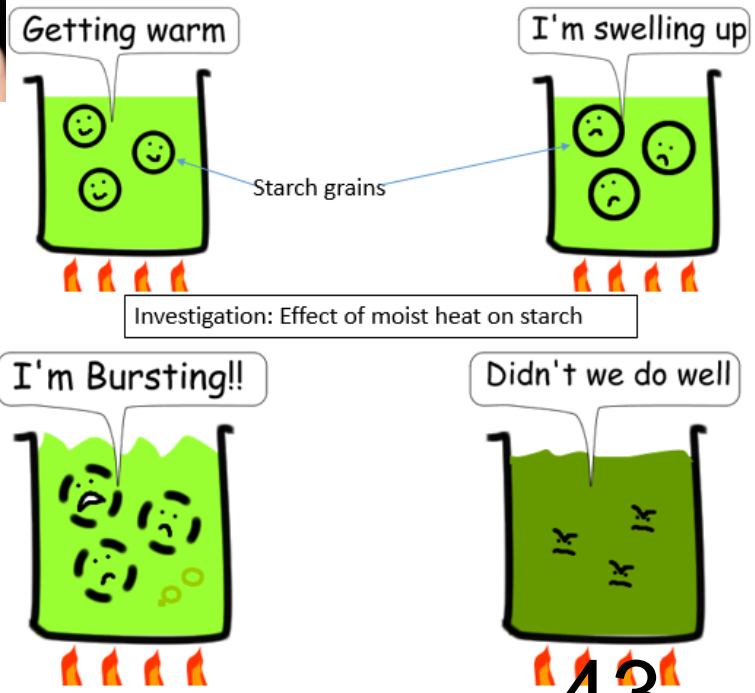


Dextrinization

Chemical formula for glucose



a. The starch grains when **heated** between 62◦C and 80◦ C with the liquid **absorbs the liquid.**
b. As it does so it **swells/expands.**
c. When it is no longer able to hold any more liquid the **starch grains burst** to release starch causing the **sauce to thicken.**



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

Food Technology

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

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%

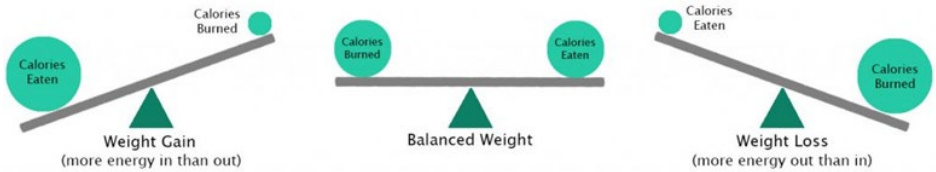
Sources:

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
- 19-64years: aim to do at least 150 minutes of moderate intensity activity a week or 75 minutes of vigorous intensity activity a week.

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=D6eor1wkNFY

Food Technology