KNOWLEDGE ORGANISER

£2

NAME & FORM

YEAR 9

SPRING TERM

English Knowledge Organiser

YEAR 9 – Sherlock Language Paper 1

Spring 1

Sherlock Holmes – The Speckled Band

Where this is a gap, fill it with a quote or an idea about the investigation:

Suspects and Motives:

Dr Roylott:

Very angry and aggressive:

Has previously harmed people:

_____"a certain annual sum should be allowed to each us in the event of marriage"

The Gypsies:

_____

"He would give these vagabonds leave to encamp upon the few acres of bramble-covered land"

Other Suspects:

The client – Miss Helen Stoner:

Young but aged:

Frightened:

: "has done me the honour to ask my hand in marriage"

Information about the case:

- Helen's sister died _____ weeks before her own wedding, and Helen is about to wed.
- Helen's sister heard _____
- When she was killed she shouted _____
- It was an unusual death because

Question 1: List 4 Things

Marks: **Timing:**

Approach: Read very carefully through the lines given. Write in short, complete sentences such as "He lived alone." or "He didn't own a car."

Key Skill(s): Information retrieval

Question 2: Language

Marks: **Timing:**

Amount: Aim to produce two-three paragraphs analysing different quotations in detail.

Approach: Identify the lines of the extract the question asks you to write about and draw a box around those lines. Read through the lines and highlight anything which could help you answer the question. Add annotations to identify effects and techniques within the quotations. Complete 2-3xQTA paragraphs in your response.

Key Skill(s): Q_ _ _ _ T_ _ _ _ _ _ _ _ A_ _ _ _ _ _ _

Remember to… clearly explain your points using causal connectives like "because", "as" or "meaning that" and zoom in on key words to analyse language on a deeper level. Use the sentences starters given on your Language Paper 2, Q3 KO!

Question 3: Structure

Marks: **Timing:**

Amount: Aim to produce two-three paragraphs analysing how the writer has structured the text at different points.

Approach: Read through the source and make a note of what each paragraph (or section of dialogue) focuses on. Identify any links between different parts of the text, such as motifs or references that occur more than once, and add annotations to identify effects and techniques within these. Complete 2-3xQTA paragraphs in response to the question.

Key Skill(s): Q_ _ _ _ T_ _ _ _ _ _ _ _ A_ _ _ _ _ _ _

Remember to… clearly explain your points using words like "because" or "meaning that" and ensure you cover more than one part of the text. Make sure not to analyse language here, either!

Possible sentence starters to consider:

At the beginning of the extract, the writer has chosen to focus on… when they wrote "…"

I think the writer has opened the extract with this because…

The writer then moves on to talk about… as shown in "…"

It is quite clear from this shift in focus from… to… that the writer wanted to…

Question 4: Evaluation

Marks: **Timing:**

Amount: Aim to produce two-three paragraphs evaluating to what extent you agree with the statement in the question.

Approach: Similar to Q2. : Identify the lines of the extract the question asks you to write about and draw a box around those lines. Read through the lines and highlight anything which could help you answer the question. Add annotations to identify effects and techniques within the quotations. Complete 2-3xQTA paragraphs in your response.

Key Skill(s): Q_ _ _ _ T_ _ _ _ _ _ _ _ A_ _ _ _ _ _ _ E_ _ _ _ _ _ _ _ _

Remember to… use all your language analysis skills from question 2, but always link every point back to the statement and whether you agree/disagree with it.

Focus on: Finding evidence to back up the evaluative statement!

Possible sentence starters to consider:

One way the writer (reference to question) is… in "…"

This clearly portrays that… because…

The word '…' is particularly effective at conveying this idea because…

Alternatively, the writer may also be implying that…

As a reader, this description…

It is quite clear from this that the writer (reference to question)…

However, it could also be said that…

English Knowledge Organiser – Prejudice Scheme Y 9

Definition of Prejudice

Prejudice = a negative opinion that is
predetermined and is not based on reason or actual experience

Prejudices come from a variety of origins:

- Historical prejudice (slavery, wars, terrorism…)
- Roles in society (women = mothers/housekeepers, men = workers)
- Media depiction
- Family/peer opinions
- Laws and the government (gay and transgender rights)
- Scapegoating (Jews in Nazi Germany)
- Ignorance/lack of education
-

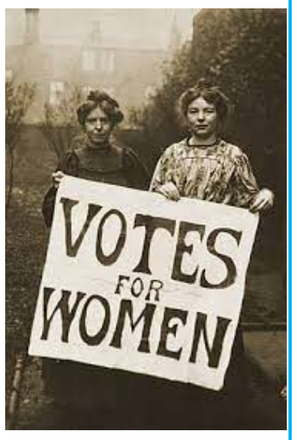
Can you think of any more examples? Write them below:

Slang = informal language that is used in relaxed situations usually verbally.

Slang can often be part of a person's dialect and there is specific examples of slang from different places.

But there is also many common slang words that are used across the world by English speaking people, such as:

- Swear words
- Insults
- Idioms
- Colloquial words such as 'knackered', or 'gobsmacked'



UK DIALECTS

- Scottish
- Geordie
- Scouse
- Yorkshire
- Welsh
- Brummie
- West Country
- R.P (Received Pronunciation)
- Essex
- Cockney

Can you think of any examples of 'slang'?

How has it entered our language?

Slang I use	How it has entered language

Slang enters our language in lots of different ways:

Portmanteau:

- **Email**
- **Hangry**
- **Emoticons**

Acronym:

- **LOL**
- **BRB**

New words:

- **Flex**
- **Binge-watch**

Abbreviations:

- **Brill**
- **Insta**

Repurposing old words:

- **Extra**
- **Wig**
- **Fire**

English Knowledge Organiser Y9 Prejudice Spring 2

Women Rights' Timeline: **Read the key events for the dates below, based on the progress of Women's Rights. Consider which event you think is most significant.**

1660- Margaret Hughes becomes the first professional actress.

1866- A law forbids women to work more than 10 hours a day.

1869- John Stuart Mill publishes his book The Subjection of Women.

1885- Women first play tennis at Wimbledon

1886- Women are allowed to vote in county and borough elections.

1914- Britain gets its first policewomen.

1919- A new law opens certain professions to women.

1922-Ivy Williams is the first woman called to the bar of England and Wales.

1925- Ethel Mary Colman is the first woman Lord Mayor in Britain (of Norwich).

1928- In Britain, all women over 21 are allowed to vote the same as men.

1975- Women gain the right to maternity pay.

1983- Mary Donaldson becomes the first woman Lord Mayor of London.

Look/cover/check
Complete the blank side of the timeline

1680 – 1834
Transatlantic slave trade

1686 – 1733
Nanny of the Maroons leads escaped Jamaican slaves

1841 - 1853
Solomon Northup kidnapped into slavery for 12 years

1854 - 1857
Mary Seacole nurses soldiers in the Crimean war

Task: *LOOK/COVER/SAY*

- Label the class pyramid
- Define and give examples of each class

Upper class

- ✓ Rich; usually inherits wealth
- ✓ Aristocracy (earls, dukes etc)
- ✓ Private schools, country houses

Middle class

- ✓ Professional/ highly educated
- ✓ Doctors, teachers, skilled tradesperson such electrician etc

Lower/ working class

- ✓ Lower income
- ✓ Usually less formal education
- ✓ Often manual work
- ✓ Shop assistant,

Key vocabulary: colonialism = forcibly taking over or controlling another country

Examples of four *countries that were part of the British Empire.*

1. Canada
2. India
3. United Kingdom
4. Australia

Look/Cover/Say

1. **Passionate** = feels/believes strongly
2. **Endurance** = stamina/resilience
3. **Determined** = strong resolve
4. **Courageous** = Brave
5. **Resourceful** = can overcome difficulties
6. **Independent** = doesn't need others

Look/Cover/Say

1. **Passionate** =
2. **Endurance** =
3. **Determined** =
4. **Courageous** =
5. **Resourceful** =
6. **Independent** =

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!

Devising

Themes

What is your educational message?

BRAINSTORM

Create a story board to come up with your story

STRUCTURE

Highlight your key scenes and keep them in the piece

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

Andrea Joseph

Key features:

Biro pen- Cross hatching- Hatching- Layering- Shape- Form- Texture- Detail

Working in the style of an artist:

You need to use these techniques and features in your own study.

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

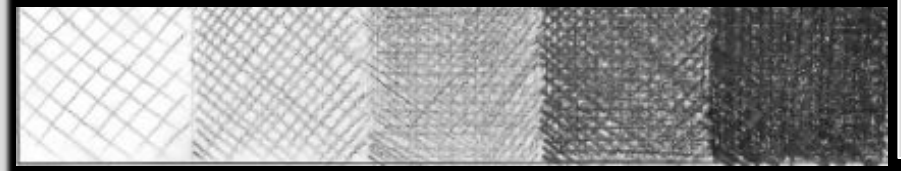
Mark Making techniques

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!

Geography Knowledge Organiser

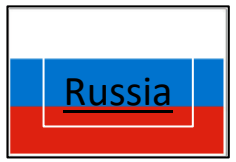
A megacity is a city with more than 10 million people.

Around 55% of Russia is uninhabited.

Russia has 9 time zones.

Eurasia is the combined landmass of Europe and Asia.

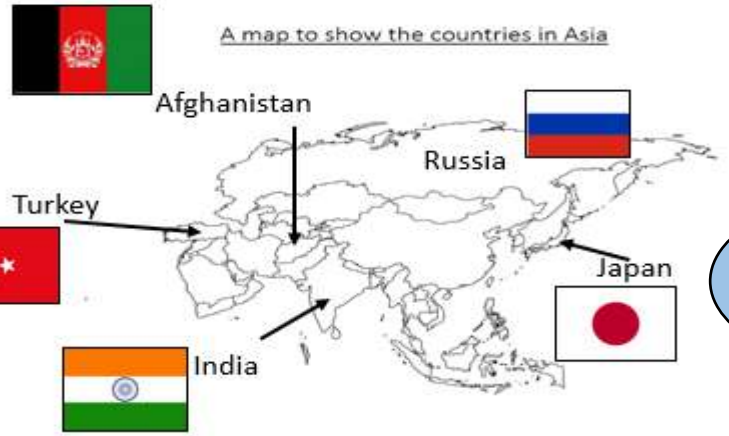
The life expectancy of men is 64 in comparison to the UK which is 80.



70% of the population live in towns and cities.

The first man visited space in 1950.

Russia is 70 times bigger than the UK.



Irrigation is to provide water to crops (water farmers fields)

Why do floods happen in Bangladesh?

Human

Deforestation
Urbanisation
Impermeable surfaces
Building on Flood plains

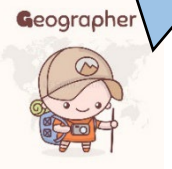
Physical

Monsoons
Snow melt
Heavy precipitation
Low lying land

Causes:
Cyclones cause coastal flooding, **low- lying land**, melt water from the **snow** on the Himalayas, heavy **monsoon** rains (500mm per day), increased **urbanisation**

2007 flood: Prolonged and heavy rainfall (the ground became saturated) and the melting of glaciers in the Himalayas.

Saturated soil is when the ground is already soggy from previous floods.



Case Study: Bangladesh Floods

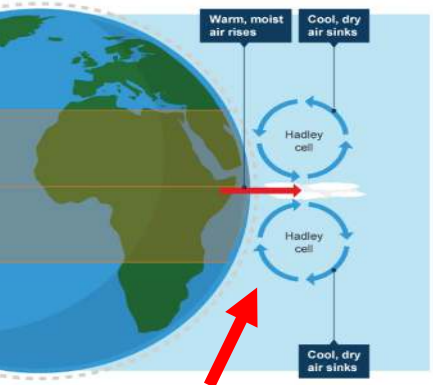
- Floods are an annual event. **The majority of the 157 people** that live in Bangladesh live on **floodplains** of the Padma (Ganges) and Jamuna (Brahmaputra).
- Flooding is essential as it brings water to irrigate the crops. Also as the rivers flood it lines the fields with silt which fertilises the soil.
- 75% of the country is below 10m above sea level.

Immediate Responses (straight away)	Long Term Responses (weeks, months, years later)
• Food **supplies**, medicine, clothing and blankets were distributed. • Local people helped search for missing people. • **Water Aid** helped by bringing water purification tablets and education campaigns. • Free seed given to farmers (these took months to grow)	• **Volunteers** and aid workers were left to repair the damage due to lack to funds • The UN launched and appeal to raise $74 million, but had received only 20% of this • **USA donated a weather station** to help forecast future catastrophic flooding. • **Flood Action Plan** is in place – embankments were built – these are not always successful.

Year 9: Autumn 2 Asia

Geography Knowledge Organiser

Deserts are dry or **arid** areas that receive less than **250** mm of rain each year. Deserts can be **hot** or **cold.** They contain **flora** and **fauna** that are specially **adapt** to these extremely dry conditions.



Why do deserts form?

- Air around the Tropics of Capricorn and Cancer is dry. This is a zone of high pressure (air sinks)
- Air at the equator rises and cools - condensation then forms rain.

Most hot deserts are found between 15-30° north and south of the **equator.**

A climate graph of a desert biome

Diurnal range – the difference between the lowest temperature at night and the highest temperature during the day.

Trend
Evidence
Anomaly

- Climate graphs show the annual (yearly) rainfall for an area.
- The bar represents the precipitation.
- The line graph shows the temperature

From the climate graph I can see that the highest precipitation is in the month of January (2.4 cm) and the highest temperature is July/ August (36 degrees)

The Gobi Desert is the largest desert in Asia, spanning over 1,600 km (1,000 miles) over China and Mongolia, and the 5th largest desert in the world.

China: The Four Pests Campaign

In the 1940s China was full of infectious diseases such as cholera and malaria and the death toll reached **10.5 million people.**

The government enforced a policy to eradicate the pests **(kill rats, mosquitos, flies and sparrows**) to prevent any further deaths.

The policy saw the death of **1 billion sparrows**, **1.5 billion rats**, **100 million KG of flies** and **11 million KG of mosquitos.**

With sparrows (consumers) locusts came and ate all of the grain. As a result, across China million starved (famine) and **20 – 30 million people died between 1958 – 1962.**

- Syria is located in the continent of Asia.
- Syria is SW of the UK.

A peaceful uprising against the president of Syria on the 15th March 2011 turned into a full scale civil war.

More than half of Syria has been displaced (have no where to live).

Key Word	Definition
Internal Migration	moving within a state, country, or continent
Immigration (INcoming)	moving into a new country
Migrant	a person who moves form one place to another
Emigration (Exciting)	leaving one country to move to another
Seasonal Migration	moving with each season or in response to labour or climate conditions
Refugee	a person who has been forced to leave their country in order to escape war, persecution, or natural disaster

More than half of Syria has been displaced (have no where to live).

1.5 million people with permanent disabilities, including 86,000 who have lost limbs.

Year 9: Autumn 2 Asia

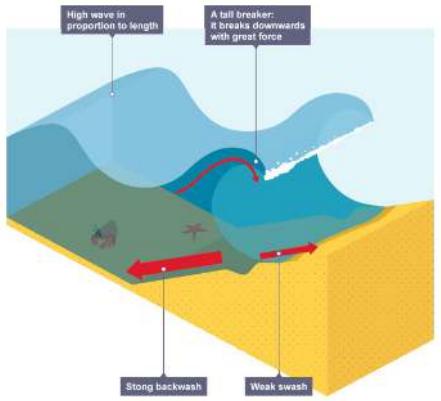
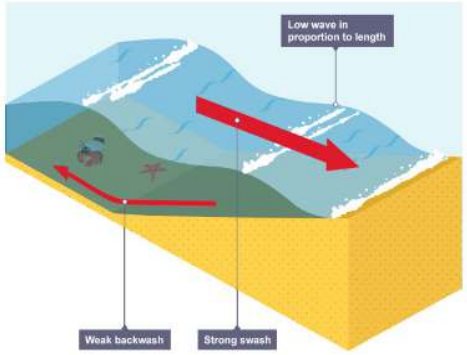
Geography Knowledge Organiser - Coasts

How do waves shape the coastline?

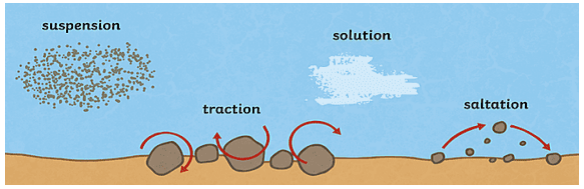
Waves form when the wind blows over the sea. The size and energy of the wave depends on:

- The fetch
- Strength of the wind
- How long the wind has been blowing

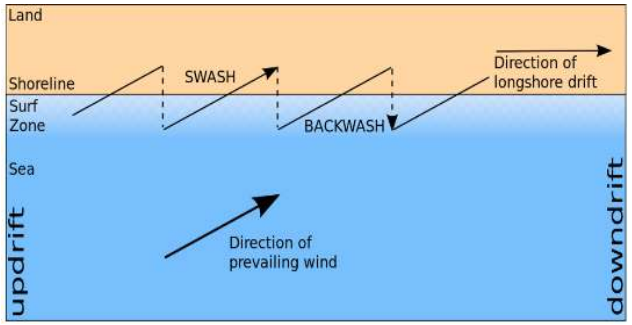
Find out more about longshore drift.

Destructive Wave	Constructive Wave
	
• Weak swash • Strong backwash • Removes sand (sediment) from the beach • Destroys the beach • The waves are steep and close together	• Strong swash • Weak backwash • Brings sand (sediment) on to the coast and builds the beach • Creates the beach • The waves are low and further apart

Fetch is how far a wave travels



How does longshore drift move material along the coast?



Sediment is any solid material eroded, transported and deposited along the coast

Swash is the movement of sediment **up** the beach at an **angle.**

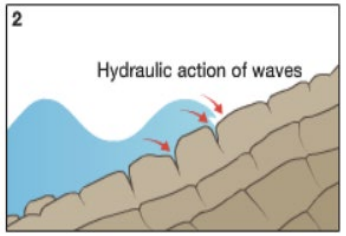
Backwash is the movement of sediment **back** towards the sea at a 90 degree angle.

Longshore drift is the movement of material along the coast. The prevailing wind blows waves carrying sediment into the beach at an angle, the waves break on the shore and as the water runs back into the sea it carries sediment back down the beach in a **zig zag** motion.

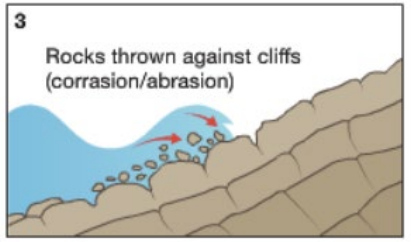
Erosion

Erosion – is the wearing away of rock along the coastline.
Destructive waves are responsible for the erosion (breaking down) of the coastline.

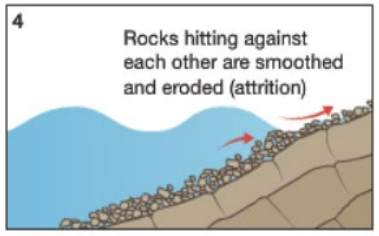
Hydraulic action - this is the sheer power of the waves as they smash against the cliff. Air becomes trapped in the cracks in the rock and causes the rock to break apart.



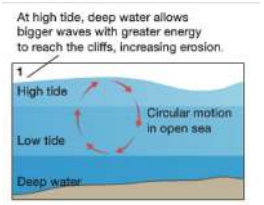
Abrasion - this is when pebbles grind along a rock platform, much like sandpaper. Over time the rock becomes smooth



Attrition - this is when rocks that the sea is carrying knock against each other. They break apart to become smaller and more rounded.



Solution - this is when sea water dissolves certain types of rocks. In the UK, chalk and limestone cliffs are prone to this type of erosion.



Geography Knowledge Organiser - Coasts

Deposition

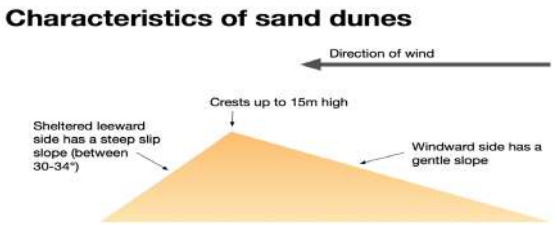
Deposition is **when material that is being transported is dropped by constructive waves**. It happens because waves have less energy. Deposition happens when the swash is stronger than the backwash and is associated with constructive waves

Deposition is likely to occur when:
- waves enter an area of shallow water;
- waves enter a sheltered area, eg a cove or bay;
- there is little wind;
- a river or estuary flows into the sea reducing wave energy;
- there is a good supply of material and the amount of material being transported is greater than the wave energy can transport.

Test yourself – complete the BItesize quiz

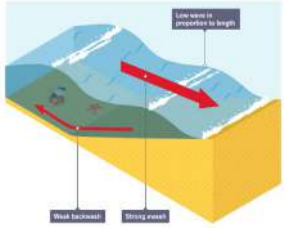
Features formed by deposition

Sand Dunes



The conditions required for sand dunes to form include:
- a large supply of sand
- a large flat **beach**
- time for sand to dry, so a large tidal range is needed
- an onshore wind (wind blowing from the sea to the land) for sand to be moved to the back of the **beach**
- an obstacle for the dune to form against e.g pebble or driftwood

- Sand dunes are created around obstacles on the beach eg a dead animal
  The sea brings sediment to the beach and then the wind redistributes that sediment.
- When the wind encounters the beach obstacles velocity falls and sediment is **deposited – this creates the embryo dune.**
  Over time, tough plants known as **pioneers** such as Marram grass take root on the dune, their root systems helping to stabilise the sand.



Spits

A **spit** is an extended stretch of beach material that projects out to sea and is joined to the mainland at the other end.

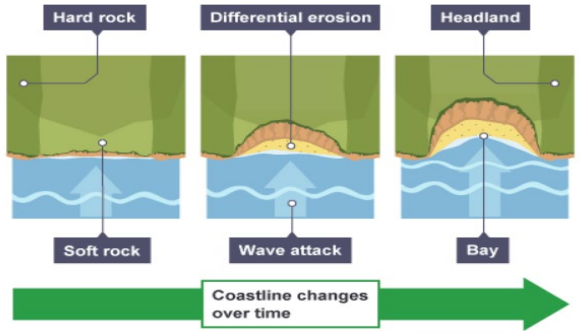
Spits are formed where the prevailing wind blows at an angle to the coastline, resulting in **longshore drift.**

1.**Longshore drift** moves material along the coastline.
2.A **spit** forms when the material is deposited.
3.Over time, the spit grows and develops **a hook** if wind direction changes further out.
4.Waves cannot get past a spit, which creates a sheltered area where silt is deposited and mud flats or **salt marshes** form

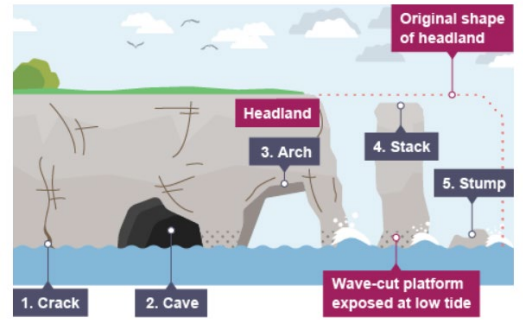
Features formed by erosion

Headlands and Bays

Headlands and bays form at a **discordant coastline** where there are layers of hard and soft rock.
- The bands of soft rock, such as sand and clay, erode more quickly than the more resistant rock, such as chalk.
- The section of land jutting out into sea is called a headland.
- The area where the soft rock has eroded away is called a bay.
- Sand is deposited in the sheltered bay to form beaches.



Caves, Arches, Stacks and Stumps



Caves occur when waves force **(hydraulic action)** their way into cracks in the cliff face.

If the cave is formed in a headland, it may eventually break through to the other side forming an **arch**.

The arch will gradually become bigger until it can no longer support the top of the arch. When the arch **collapses**, it leaves the headland on one side and a **stack** (a tall column of rock) on the other

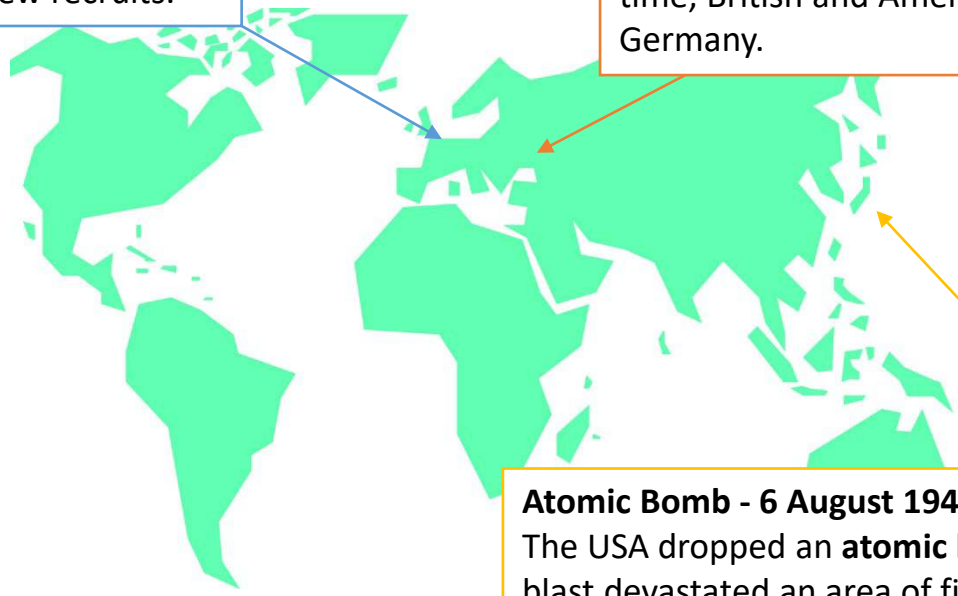
The stack will be attacked at the base in the same way that a wave-cut notch is formed. This weakens the structure and it will eventually **collapse** to form a **stump**

History Knowledge Organiser:

Turning point of World War 2

Dunkirk - 26 May to 4 June 1940 The Battle of Dunkirk was fought around the French port of Dunkirk during the Second World War, between the Allies and Nazi Germany. As the Allies were losing the Battle of France on the Western Front, the Battle of Dunkirk was the defence and evacuation of British and other Allied forces to Britain. By saving the British expeditionary Force, the British government had kept its professional army alive. It would be able to fight in future battles and train new recruits.

Stalingrad - <u>July 1942 – February 1943</u>
In the USSR, after 4 months of very fierce fighting in the city of Stalingrad, a large proportion of the German army surrendered. Gradually, Soviet forces (the USSR's forces) began to push the German army out of the USSR and back towards Germany. This was the first time the Germans had retreated in large numbers. At the same time, British and American bombers began air raids on Germany.



Pearl Harbour – 7th December 1941
The attack on Pearl Harbour was a surprise military strike by the Imperial Japanese Navy Air Service upon the United States (a neutral country at the time) against the naval base at Pearl Harbour in Honolulu, Hawaii. Hundreds of Japanese fighter planes descended on the base, where they managed to destroy or damage nearly 20 American naval vessels, including eight battleships, and over 300 airplanes. More than 2,400 Americans died in the attack, including civilians, and another 1,000 people were wounded. The attack led to the United States' formal entry into World War II the next day.

Atomic Bomb - 6 August 1945
The USA dropped an **atomic bomb** on the Japanese city of Hiroshima. The blast devastated an area of five square miles, destroying more than 60 per cent of the city's buildings and killing around 140,000 people. Three days later the USA dropped a second atomic bomb on the Japanese city of Nagasaki, killing around 74,000 people. The official US justification for the dropping of the two atomic bombs was to force the Japanese government to surrender, which it did on 14 August 1945. Some historians have speculated that the bombs might also have had another purpose - to send a warning to the Soviet Union about the strength of the American military

History Knowledge Organiser: *Holocaust and Genocide*

Timeline: Persecution of the Jewish community

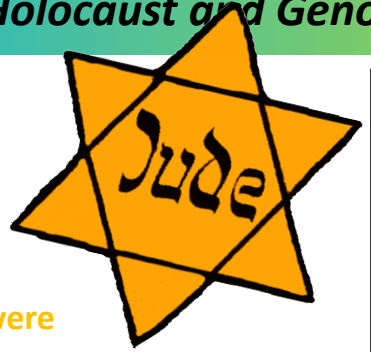
1933
- The **SA** organised a **boycott** of Jewish shops and businesses.
- Books by Jewish authors were publicly burnt.
- Jewish civil servants, lawyers and teachers were sacked, and Jewish doctors and dentists could not treat **Aryans**.
- Science lessons about race were introduced which **taught that 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.



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

Adolf Hitler – leader of the Nazi Party. He was a **great orator** (public speaker) who hypnotised 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,

Heinrich Himmler was the Head of the SS. He was in overall charge of the *'Final Solution' and* believed that he was 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.

German people of all jobs and backgrounds saw the Jews were being treated differently and did not protest. Many had even stopped buying goods at Jewish stores. Only a small number of German people stood up for the Jews.

Anne Frank was a German girl and Jewish victim of the Holocaust who is famous for keeping a diary of her experiences. Anne and her family went into hiding for two years to avoid Nazi persecution

History Knowledge Organiser:

Holocaust and Genocide

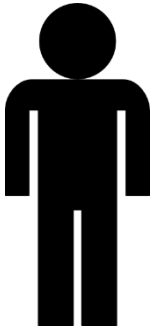
Death camps

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.

Key words:
Holocaust - the mass murder of Jewish people under the German Nazi regime during the period 1941–5. More than 6 million European Jews, as well as members of other persecuted groups such as Romani, gay people, and disabled people, were murdered at concentration camps such as Auschwitz.

Genocide – The deliberate killing of a large number of people from a particular nation or ethnic group with the aim of destroying that nation or group.

Hitler's hate 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

During the **Rwandan genocide** of 1994, members of the Hutu ethnic majority in the east-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.

The **Cambodian Genocide** was the murder of millions of Cambodians 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 .

RE Knowledge Organiser. Relationships

Key concepts / words

Gender Equality – All genders have the same rights

Responsibilities – Actions or duties you are expected to carry out.

Roles – The position of a person

Sacrament – an outward sign of an inward blessing / a ceremony blessed by God

Families and gender roles

Families are important in Christianity and essential for society. Through the family, values are learnt and faith is developed. Children should respect their parents as the 10 commandments teach ***'honour your mother and father'.***
Men and women should have equal roles as all God's creation and ***'God made man in His image'.***

Equal	Not equal
Jesus first revealed himself to women after his resurrection. ***'God made man in His image***' – all equal ***'Neither Greek or Jew, slave or free, male of female, all one in Jesus'.*** – all equal Islam – '***All equal as the teeth of a comb'*** – all equal	Jesus's disciples were men. Women are not ordained in the Catholic Church St Paul refers to '***women should learn in quietness***' and that women should not teach or assume '***authority over a man'***. In Islam women cannot be **Imams**. Men and women worship separately in the Mosque.

Adultery - Having sexual relations with someone other than your marriage partner.
Not allowed and a sin. Breaks the marriage vows and the 10 commandments teach ***'do not commit adultery'.***
Adultery may harm the family unit. In Islam it goes against the unity and peace of the Ummah and Muslims believe you will be judged in the afterlife on your actions in this life.

Marriage

Marriage is considered as God's intention – Adam and Eve were married.
Marriage is a **sacrament** and blessed by God.
Vows are taken to show commitment for example ***'till death do us part'.***
Marriage is the place to raise a family and have sex.

Divorce and remarriage

Catholics believe only death can end a marriage ***'til death do us part'.*** The sacrament with God is broken. The Bible teaches '***what God has joined together let no man separate'.***
Remarriage is seen as adultery and a sin ***'do not commit adultery'.***
Foe other Christians divorce maybe the 'lesser of two evils' for example if abuse or adultery has been committed – Jesus taught care and compassion 'Love your neighbour'.
In Islam divorce is a last resort and a three month reconciliation period must happen – **Iddah** period. Qur'an teaches '***Of all lawful things, divorce is the most hated by Allah'.***
A dowry provided at marriage in case of divorce and remarriage is allowed.

RE Knowledge Organiser. Relationships

Key concepts / words

Adultery – Having sexual relations with someone other than your marriage partner

Divorce – Legally ending a marriage

Cohabitation - To live together in a sexual relationship without being married or in a civil partnership

Commitment - A sense of dedication and obligation to someone or something

Contraception - Methods used to prevent a woman from becoming pregnant during or after sexual intercourse

Purpose of sex	Sex is a gift from God. After the creation of human life God gave the blessing to ***'be fruitful and multiply'.*** Sex should take place within a committed relationship such as marriage. ***'One flesh'*** – you should only have one sexual partner and that should be once you are married. Many Christians believe in **Chastity**, the belief in no sex before marriage. Adultery is forbidden and the 10 commandments teach ***'Do not commit adultery'.*** Within Islam sex is a gift from Allah to reproduce and should be used within marriage. It is a Muslims duty to have children to strengthen the **Ummah.**
Contraception 	Catholics do not agree with the use of contraception as it goes against the **sanctity of life** belief that God creates all life, contraception interferes with God's plan. The purpose of sex is to ***'be fruitful and multiply'*** contraception stops procreation. Some believe contraception devalues sex and encourages **promiscuity**. However, there is nothing in the Bible that forbids the use of contraception. Many ***'Your body is a temple'*** – contraception helps to protect your body from unwanted STIs. Christians and Muslims will allow if both partners agree. Muslims will not allow contraceptives that can potentially harm the body.
Same sex relationships  	Many Christians oppose same sex relationships on Biblical grounds. They believe God intended for man and woman to be in a committed relationship because God created **Adam and Eve**. The Bible teaches ***'No man should lie with another as he would a woman'***. This is interpreted to mean same sex relationships are wrong. Also the purpose of sex is to reproduce '***be fruitful and multiply***' same sex couples cannot do this. However, Jesus taught ***'love',*** he didn't say who you had to love. Others would argue that '***God made man in His image'*** and that we are all created equally and the way in which God intended. Same sex relationships are **haram** and forbidden in Islam. Sex should only take place between a man and woman.

RE Knowledge Organiser. Human Rights

Key concepts / words

Prejudice – Pre judging – judging people to be inferior or superior without a cause

Discrimination – Acts of treating groups of people, or individuals differently, based on prejudice

Censorship - The practice of suppressing and limiting access to materials considered offensive or a threat to security. People maybe restricted by censorship laws.

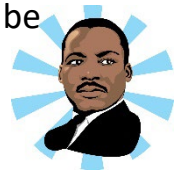
Personal Conviction - Something a person strongly feels of believes in

Relative poverty - A standard of poverty measured in relation to the standards of society in which a person lives.

Religious expression -

Prejudice and discrimination are unacceptable in Christianity. They go against religious teachings of equality. ***'God made man in His image'.*** Jesus didn't discrimination in the **Parable of the Good Samaritan** and taught '***Love your neighbour'.*** The Bible also teaches ***'There is neither Greek or Jew, slave or free, male or female, all one in Jesus'***. The **Golden Rule** states to treat others as you would want to be treated. In Islam all people are equal as they are **all Allah's creation**. The teaching ***'All equal as the teeth of a comb'*** promotes equality.

Personal Conviction is something a person strongly believes in and their actions may conflict with the law or authroity **Martin Luther King** had a personal conviction for racial equality. He led peaceful protests, used speeches, sit ins and non violence to fight against injustice. He believed all should be equal as we are all ***'Made in God's image'***. He also followed the example of Jesus ***'Love your neighbour'.***



Malala Yousafzai strongly believed girls in Pakistan deserved an education as this is her human right. She went against the authority if the Taliban in Pakistan who were not allowing girls an education. She was shot three times by the Taliban while on the school bus. Islam teaches 'All equal as the teeth of a comb' and we are all Allah's creation so should therefore be treated equally and are entitled to our human rights.

Wealth and Charity

Christians believe people should use their wealth to support others and they will be **rewarded in the afterlife**. The Bible teaches ***'It is easier for a camel to pass through the eye of a needle than for a rich man to get into heaven.'***

Christians also believe they should support those in need and charities as Jesus taught ***'love your neighbour'.*** **Parable of the Good Samaritan** teaches us to help those in need.

Christian Aid aim to end poverty and injustice.

Muslims believe **wealth is gift from Allah** and should be used correctly. You will be judged on how you have used your wealth. Muslims are expected to give **Zakah**. This is the third pillar of Islam and it is a Muslims duty to give 2.5% of wealth to charity to help those in need. They follow the example of the **Prophet Muhammad.** **Islamic relief** is an example of an Islamic charity.

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

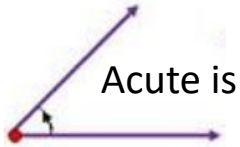
$= (number\ of\ sides - 2) \times 180$

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

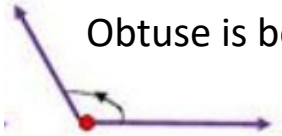
Types of angle

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

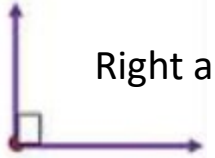
Examples



Acute is less than 90°



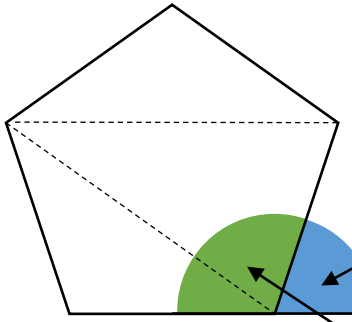
Obtuse is between 90° and 180°



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

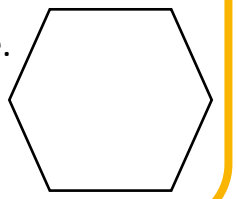
Y9

Key Words

Polygon
Interior angle
Exterior angle
Acute
Obtuse
Right angle
Reflex

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.



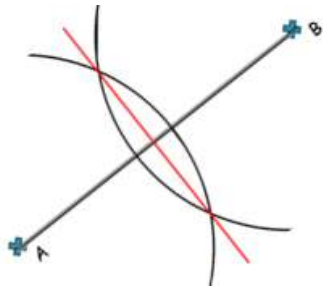
ANSWERS: 1) 720° 2) 60° 3) 120°

Maths Knowledge Organiser

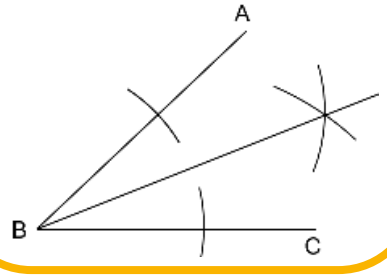
CONSTRUCTIONS

Key Concept

Line Bisector



Angle Bisector



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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.

Tip

Watch for scales.

For a scale of:
1 cm = 4 km.

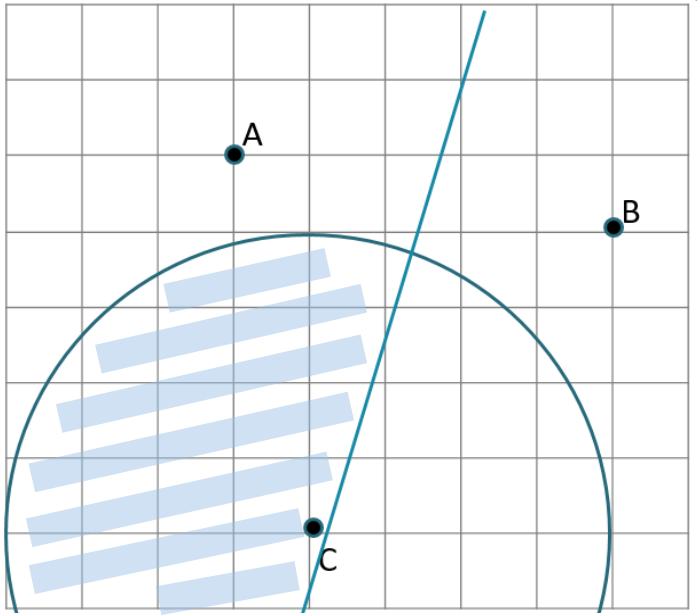
20 km = 5 cm
6 cm = 24 km

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



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

Maths Knowledge Organiser

PYTHAGORAS

Key Concepts

Pythagoras' theorem and basic trigonometry both only work with **right angled triangles**.

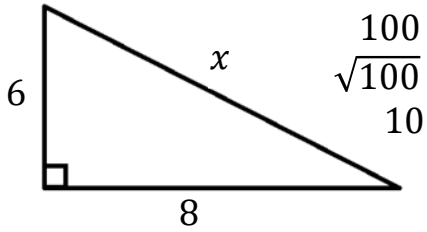
Pythagoras' Theorem – used to find a missing length when two sides are known

$$a^2 + b^2 = c^2$$

c is always the hypotenuse (longest side)

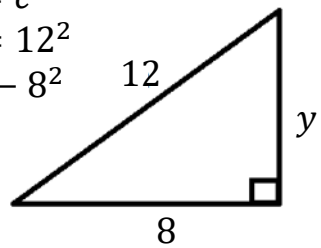
Pythagoras' Theorem

Examples



$$a^2 + b^2 = c^2$$
$$6^2 + 8^2 = x^2$$
$$100 = x^2$$
$$\sqrt{100} = x$$
$$10 = x$$

$$a^2 + b^2 = c^2$$
$$y^2 + 8^2 = 12^2$$
$$y^2 = 12^2 - 8^2$$
$$y^2 = 80$$
$$y = \sqrt{80}$$
$$y = 8.9$$



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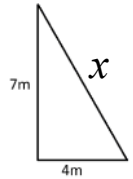
Key Words

Right angled triangle
Hypotenuse
Length
Shorter-side
Square
Square-root

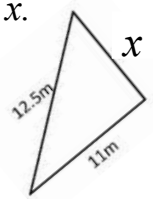
Questions

Find the value of x.

a)



b)



ANSWERS: a) 8.06m b) 5.94m

Maths Knowledge Organiser

4 OPERATIONS WITH FRACTIONS

Key Concepts

An **improper fraction** is when the numerator is larger than the denominator e.g. $\frac{20}{12}$

Converting from a mixed number into an improper fraction:

$$2\frac{3}{5} = \frac{(2\times 5)+3}{5} = \frac{13}{5}$$

A **reciprocal** is the value that when multiplied by another gives the answer of 1.

Eg. $\frac{1}{8}$ is the reciprocal of 8.

$\frac{2}{5}$ is the reciprocal of $\frac{5}{2}$

Examples

$1\frac{2}{3} + 2\frac{1}{4}$

$= \frac{5}{3} + \frac{9}{4}$ — Convert into an improper fraction

$= \frac{20}{12} + \frac{27}{12}$ — Find a common denominator

$= \frac{47}{12}$

$= 3\frac{11}{12}$ — Convert back into a mixed number

$2\frac{2}{3} - 1\frac{1}{4}$

$= \frac{8}{3} - \frac{5}{4}$ — Convert into an improper fraction

$= \frac{32}{12} - \frac{15}{12}$ — Find a common denominator

$= \frac{17}{12}$

$= 1\frac{5}{12}$ — Convert back into a mixed number

$1\frac{1}{3} \times 2\frac{3}{4}$

$= \frac{4}{3} \times \frac{11}{4}$ — × then ×

$= \frac{44}{12}$

$= 3\frac{8}{12}$

$2\frac{1}{3} \div 1\frac{3}{5}$

$= \frac{7}{3} \div \frac{8}{5}$ — Find the reciprocal of the second fraction….

$= \frac{7}{3} \times \frac{5}{8}$ — …and multiply

$= \frac{35}{24}$

$= 1\frac{11}{24}$

Y9

Key Words

Fraction
Equivalent
Reciprocal
Numerator
Denominator
Improper/Top heavy
Mixed number

Calculate:

1) $1\frac{2}{3} + 2\frac{3}{4}$

2) $3\frac{3}{4} - 1\frac{1}{3}$

3) $3\frac{1}{5} \times 1\frac{2}{3}$

4) $1\frac{3}{5} \div 2\frac{7}{10}$

What is the reciprocal of:

5) $\frac{2}{3}$

6) 9

7) 0.75

ANSWERS A 1) $4\frac{5}{12}$ 2) $2\frac{5}{12}$ 3) $5\frac{1}{3}$ 4) $\frac{16}{27}$ 5) $\frac{3}{2}$ 6) $\frac{1}{9}$ 7) $\frac{4}{3}$

Maths Knowledge Organiser

INDICES AND ROOTS

Key Concepts

$a^m \times a^n = a^{m+n}$

$a^m \div a^n = a^{m-n}$

$(a^m)^n = a^{mn}$

$a^{\frac{1}{n}} = \sqrt[n]{a}$

$a^{-m} = \frac{1}{a^m}$

Examples

Simplify each of the following:

1) $a^6 \times a^4 = a^{6+4}$
$= a^{10}$

2) $a^6 \div a^4 = a^{6-4}$
$= a^2$

3) $(a^6)^4 = a^{6\times4}$
$= a^{24}$

4) $(3a^4)^3 = 3^3a^{4\times3}$
$= 27a^{12}$

5) $\frac{5^2 \times 5^6}{5^4} = \frac{5^8}{5^4}$
$= 5^{8-4}$
$= 5^4$

6) $a^{\frac{1}{2}} = \sqrt{a}$

7) $9^{\frac{1}{2}} = \sqrt{9}$
$= 3 \text{ or } -3$

8) $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

Y9

Key Words

Powers
Roots
Indices
Reciprocal

Simplify:

1) $a^3 \times a^2$ 2) $b^4 \times b$ 3) $d^{-5} \times d^{-1}$ 4) $m^6 \div m^2$ 5) $n^4 \div n^4$

6) $\frac{8^4 \times 8^5}{8^6}$ 7) $\frac{4^9 \times 4}{4^3}$ 8) $(3^2)^5$ 9) $81^{\frac{1}{2}}$ 10) 5^{-2}

ANSWERS: 1) a^5 2) b^5 3) d^{-6} 4) m^4 5) 1 6) 8^3 7) 4^7 8) 3^{10} 9) 9 or −9 10) $\frac{1}{25}$

AVERAGES FROM A TABLE

Key Concepts

Modal class (mode)
Group with the highest frequency.

Median group
The median lies in the group which holds the $\frac{total\ frequency+1}{2}$ position. Once identified, use the cumulative frequency to identify which group the median belongs from the table.

Estimate the mean
For grouped data, the mean can only be an estimate as we do not know the exact values in each group. To estimate, we use the midpoints of each group and to calculate the mean we find $\frac{total\ fx}{total\ f}$.

Examples

Length (L cm)	Frequency (f)	Midpoint (x)	fx
$0 < L \leq 10$	10	5	$10 \times 5 = 50$
$10 < L \leq 20$	15	15	$15 \times 15 = 225$
$20 < L \leq 30$	23	25	$23 \times 25 = 575$
$30 < L \leq 40$	7	35	$7 \times 35 = 245$
Total	55		1095

a) Estimate the mean of this data.
step 1: calculate the total frequency
step 2: find the midpoint of each group
step 3: calculate $f \times x$
step 4: calculate the mean shown below

$$\frac{Total\ fx}{Total\ f} = \frac{1095}{55} = 19.9\text{cm}$$

b) Identify the modal class from this data set. ***" the group that has the highest frequency "***
Modal class is $20 < x \leq 30$

c) Identify the group in which the median would lie. Median $= \frac{Total\ frequency+1}{2} = \frac{56}{2} = 28th\ value$
" add the frequency column until you reach the 28th value " Median is the in group $20 < x \leq 30$

Y9

Key Words
Midpoint
Mean
Median
Modal

Cost (£C)	Frequency	Midpoint	
$0 < C \leq 4$	2		
$4 < C \leq 8$	3		
$8 < C \leq 12$	5		
$12 < C \leq 16$	12		
$16 < C \leq 20$	3		

From the data:
a) Identify the modal class.
b) Identify the group which holds the median.
c) Estimate the mean.

ANSWERS: a) $12 < C \leq 16$ b) $\frac{25+1}{2} = 13^{th}$ value is in the group $12 < C \leq 16$ c) $\frac{294}{25} = £11.76$

Maths Knowledge Organiser

DISTANCE-TIME GRAPHS

Key Concepts

A **distance-time** graph, plots time against the distance away from a starting point.

Speed can be calculated from these graphs by finding the gradient of the graph.

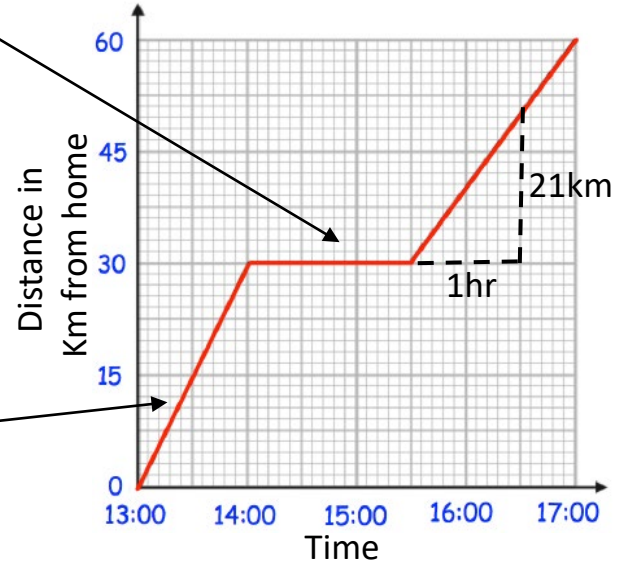
Horizontal lines are sections where the object is stationary.

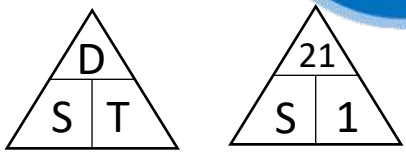
Y9

Examples

Horizontal sections are where the object is stationary

Diagonal lines show the object moving away from home or moving closer to home





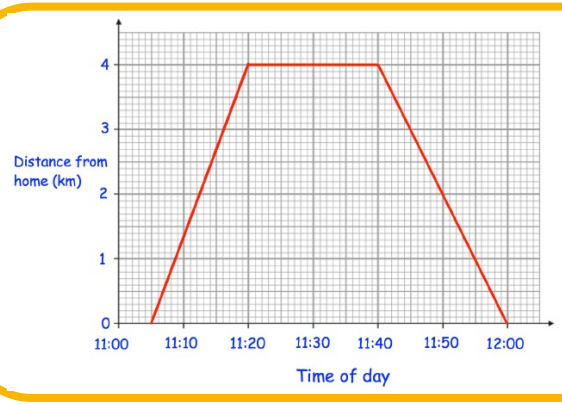
$$Speed = \frac{distance}{time}$$

$$Speed = \frac{21}{1}$$

$$Speed = 21km/h$$

Key Words

Distance
Time
Speed
Gradient
Stationary



A distance-time graph shows the journey of someone from home to the shop and back again.

1) How long were they at the shop for?
2) How far away from home is the shop?
3) How far did they travel in total?
4) What speed did they travel on the way to the shop in km/h?

ANSWERS: 1) 20 minutes 2) 4km 3) 8km 4) 16km/h

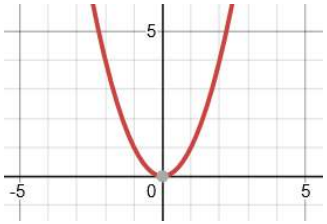
Maths Knowledge Organiser

QUADRATIC GRAPHS

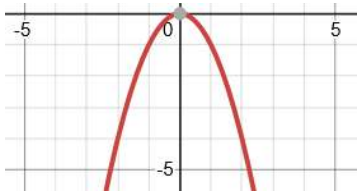
Key Concepts

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

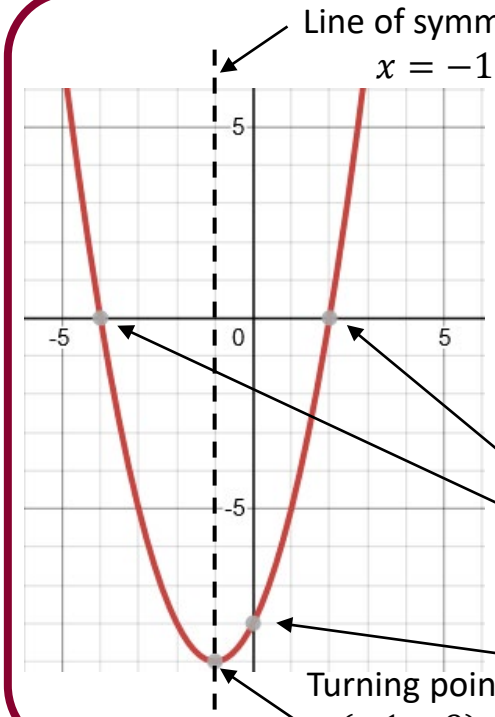
$y = x^2$



$y = -x^2$



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



Roots $x = -4$
$x = 2$

y intercept = -8

Examples

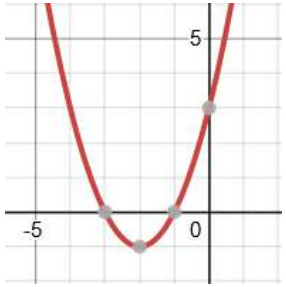
$$y = x^2 + 2x - 8$$

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.

Y9

Key Words

Quadratic
Roots
Intercept
Turning point
Line of symmetry



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

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

MFL Knowledge Organiser

Spring

T

il y avait – there was/were
était – was c'était – it was
étaient – were c'étaient – they were
il avait – he had
ils avaient – they had

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	

Irregular verbs with avoir

eu – had
bu – drank
vu – saw
lu - read
fait - did
dit – said
écrit - wrote

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

DR. & MRS. VANDERTRAMP

Infinitif	Participe Passé
Devenir	Devenu(e)(s)
Revenir	Revenu(e)(s)
&	&
Monter	Monté(e)(s)
Rentrer	Rentré(e)(s)
Sortir	Sorti(e)(s)
Venir	Venu(e)(s)
Arriver	Arrivé(e)(s)
Naître	Né (e)(s)
Descendre	Descendu(e)(s)
Entrer	Entré(e)(s)
Retourner	Retourné(e)(s)
Tomber	Tombé(e)(s)
Rester	Resté(e)(s)
Aller	Allé(e)(s)
Mourir	Mort(e)(s)
Partir	Parti(e)(s)

O

Opinions & Pronouns

P

ça

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

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	*finally*
trop	= too
assez/très	= quite /very
un peu	= a bit
vraiment	= really
incroyablement	= incredibly

C

Complexity

On peut + inf	- you can….
On peut faire	- you can do
On peut voir	- you can see

C

A

Adjectives

C'était comment? What was it like?

C'était … *It was …*
J'ai trouvé ça … *I found it …*

TIF - selon moi.. selon mon copain.. je dirais que

bien	*good*
bizarre	*weird*
cool	*cool*
cher	*expensive*
effrayant	*scary*
ennuyeux	*boring*
fabuleux	*wonderful/fantastic*
génial	*great*
horrible	*horrible/terrible*
intéressant	*interesting*
marrant	*funny/a laugh*
nul	*rubbish*
lent	*slow*
plein d'action	*full of action*

Ce n'était pas mal. *It wasn't bad.*

Il y avait un hotel cher
La ville était grande
Les monuments étaient intéressants

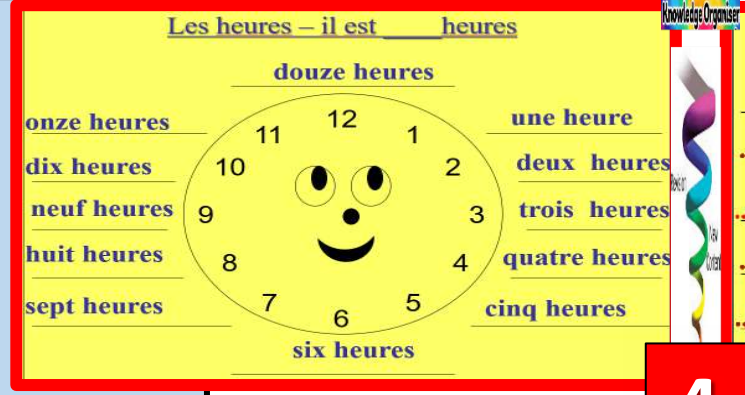
À Paris

1

J'ai **envoyé** des cartes postales.
J'ai **pris** des photos.
J'ai **vu** la *Joconde*.
J'ai **attendu** le bus.
J'ai très bien **dormi**.
Je n'ai pas visité Notre-Dame.
On a **fait** les magasins.
On a **bu** un coca.
On a **fait** un tour de la ville en segway.
On a **loué** des segways / des vélos
On a **fait** une balade en bateau-mouche.

In Paris

*I **sent** some postcards.*
*I **took** some photos.*
*I **saw** the* Mona Lisa.
*I **waited** for the bus.*
*I **slept** very well.*
***I didn't visit** Notre-Dame.*
*We **did** (went) shopping.*
*We **drank** a cola.*
*We **did** a tour of the town by segway.*
*We **hired** (some) Segways / bikes*
*We **did** (went on) a boat trip.*



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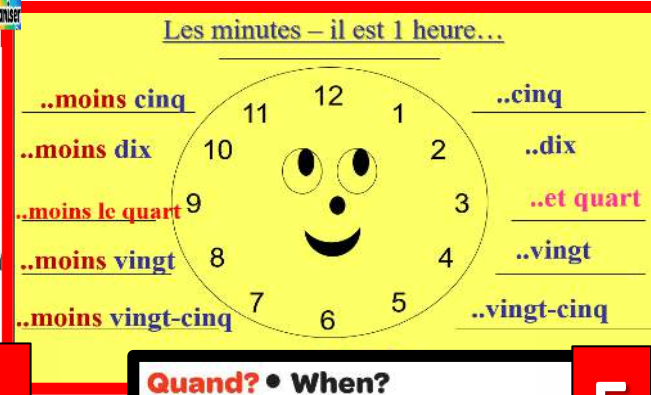


5

Quand? • When?

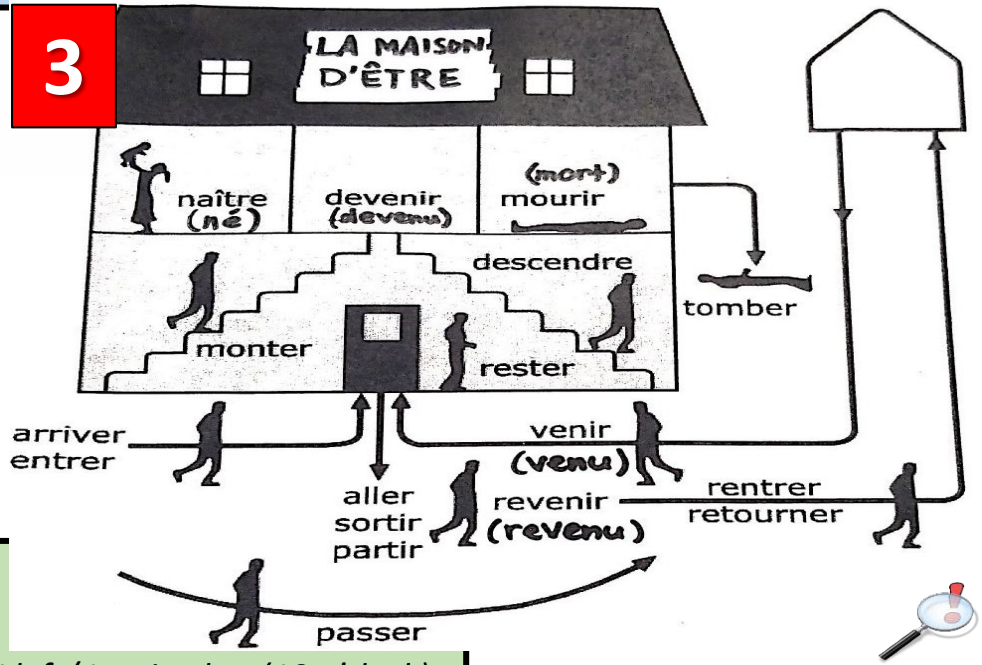
aujourd'hui	*today*
hier	*yesterday*
avant-hier	*the day before yesterday*
(mardi) dernier	*last (Tuesday)*

Les mots essentiels • *High-frequency words*

6

à quelle heure?	*when?/at what time?*
quand?	*when? (for day, month, year, etc.)*
combien?	*how much?/how many?*
où?	*where?*
un peu	*a bit*
beaucoup (de)	*a lot (of)*
d'abord	*first of all*
ensuite	*next*
puis	*then*
après	*afterwards*
finalement	*finally, lastly*

3



Tu as voyagé comment?

How did you travel?

Je suis allé(e)… / j'ai pris LE…

2a

en avion	*by plane*
en bus	*by bus*
en car	*by coach*
en metro	*by underground*
en train	*by train*
en voiture	*by car*
à vélo	*by bicycle*
à pied	*on foot*

UN VOYAGE [a trip]

Je suis allé[e] à (Paris) = *I went to (Paris)*
Je suis parti[e] / je suis arrivé(e) à 10 heures = *I left/ I arrived at (10 o'clock)*
Le train est parti/arrivé à (huit heures) = ***The train left/ arrived** at (8 o'clock)*
Je suis sorti[e] au restaurant/ resto = ***I went out** to the restaurant*
Je suis resté[e] chez moi/ à l'hotel = ***I stayed** (at home/ at the hotel)*
Je suis rentré[e] / retourné[e] en Angleterre = ***I went back** to England.*

2b

les verbes; boire – to drink voir – to see
attendre – to wait dormir – to sleep louer – to hire

7

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 - are**

T – Present tense: regular verbs

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

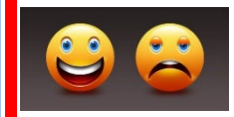
O

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

P – 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 ça m'ennuie

CELA/ ça me fâche [angers me]

C – 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)*

C – Complexity - comparisons

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

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

T – How to form the future tense with ALLER…

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

A – BRAGS Adjectives

Beauty:
1 beau: *handsome / beautiful*
2 belle: *beautiful* **3** joli[e] : *pretty*

Ranks:
1 premier[e] : *first* **2** deuxième: *second*

Age:
1 jeune: *young* **2** neu**f[ve]:** *brand new*
3 viel, vieux, vielle: *old*
4 nouvel, nouveau, nouvelle: *new*

Goodness
1 gentil[e]: *kind* **2** bon[ne]: *good*
3 mauvais[e]: *bad* **3** méchant[e]: *naughty*

Size
1 petit[e]: small **2** grand[e]: *tall*
3 gros[sse]: fat 4 énorme: *huge*

1

Les questions?	Questions?
quand?	*when?*
avec qui?	*who with / with whom?*
comment?	*how?*
à quelle heure?	*at what time?*
où?	*where?*
combien de temps?	*how long?*
Qu'est-ce que…?	*what?*
Est-ce que …?	*did …? is…?*

2

Des questions touristiques	*Tourist questions*
C'est **où**, le musée?	***Where** is the museum?*
C'est ouvert quand?	***When** is it open? (day or date)*
C'est ouvert **à quelle heure**?	***At what time** is it open?*
C'est combien, l'entrée?	***How much** does it cost to get in?*
Est-ce qu'il y a **…**	***Is** there …*
une boutique de souvenirs?	*a souvenir shop?*

4

Look for time expressions and tenses to spot whether someone is talking about the present or the past.

Present	Past
Time expressions	
d'habitude	*hier*
normalement	*samedi dernier*
souvent	*la semaine dernière*
quelquefois	*l'année dernière*
Tenses	
je visite	*j'ai visité*
je fais	*j'ai fait*
je vais	*je suis allé(e)*
je prends	*j'ai pris*
c'est	*c'était*

3

TIF - Qui a volé la Joconde?

Tu as visité le Louvre **quand**?
Tu es allé(e) **avec qui**?
Tu es allé(e) **comment**?
Tu es arrivé(e)/parti(e) **à quelle heure**?
Après, tu es allé(e) **où**?
Tu es resté(e) **combien de temps**?
Qu'est-ce que tu as fait?
Est-ce que tu as volé la Joconde?

Who stole the Mona Lisa?

When did you visit the Louvre?
Who did you go with?
How did you get there?
At what time did you arrive/ leave?
Afterwards, where did you go?
How long did you stay?
What did you do?
Did you steal the Mona Lisa?

6

les verbes utiles;

aller – to go
venir – to come
partir – to leave
rester – to stay
voler – to steal
porter – to wear

5

Des adjectifs	Some adjectives
1. c'était/ ce n'était pas	it was/ it wasn't
2. J'ai trouvé ça / [très] bien	I found it/ [very] good
3. bizzare/étrange	odd/ strange
4. cool/ sympa	cool/ nice
5. cher / couteux	expensive
6. effrayant/épouvantable	scary/frightening
7. ennuyeux/ barbant	boring
8. fabuleux / formidable	fabulous
9. génial / chouette	great
10. intéressant	interesting
11. marrant / drôle / rigolo	funny
12. nul / pas mal	rubbish/ not bad

7

Les vêtements • Clothes

Normalement, je porte …	*Normally, I wear …*
des baskets	*trainers*
des bottes	*boots*
des chaussures	*shoes*
une chemise	*a shirt*
un chapeau	*a hat*
un jean	*jeans*
une jupe	*a skirt*
un pantalon	*trousers*
un pull	*a jumper*
un sweat à capuche	*a hoodie*
un tee-shirt	*a T-shirt*
une veste	*a jacket*

Au futur • In the future

Qu'est-ce que tu vas faire/porter?	*What are you going to do/wear?*
ce weekend	*this weekend*
cet été	*this summer*

Le style • Style

J'ai un style plutôt …	*My style is rather …*
classique	*classic*
décontracté	*relaxed*
skateur	*skater*
sportif	*sporty*
C'est …	*It's …*
moche	*ugly*
horrible	*horrible*
cool	*cool*
chic	*chic*

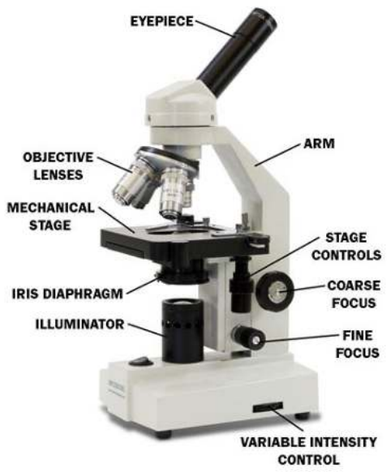
Science Knowledge Organiser

B1: Biology key concepts

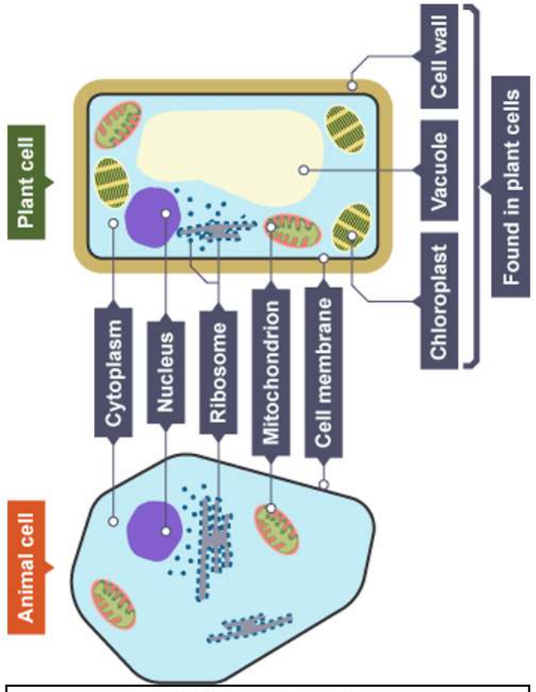
Lesson sequence

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.

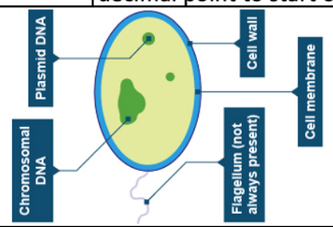


3. Measuring cells	
***Micrograph**	A picture produced by a microscope.
***Light microscope**	A microscope that uses light, can magnify up to 1500 times.
****Electron microscope**	A microscope that uses electrons to produce an image, can magnify up to 1,000,000 times.
****Actual size of a cell**	Actual 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.

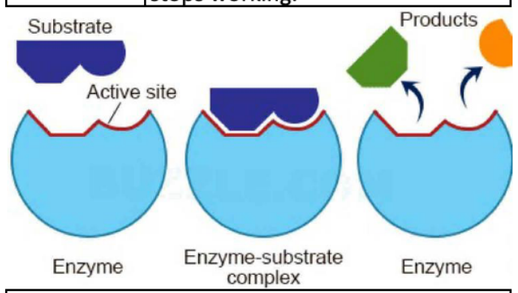
6. Bacterial cells	
***Parts of a bacterial cell**	**All bacteria:** Cell membrane, cell wall, cytoplasm, ribosomes, chromosomal DNA, plasmid DNA **Some bacteria:** flagellum.
****Chromosomal DNA**	Large piece of DNA containing most genes.
****Plasmid DNA**	Small loops of DNA containing a few genes.
****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.

Science Knowledge Organiser

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.

Science Knowledge Organiser

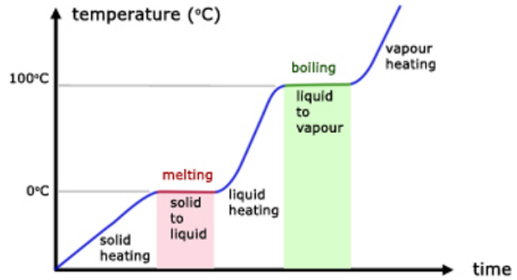
C1 & 2: States of matter and separating substances

Lesson sequence

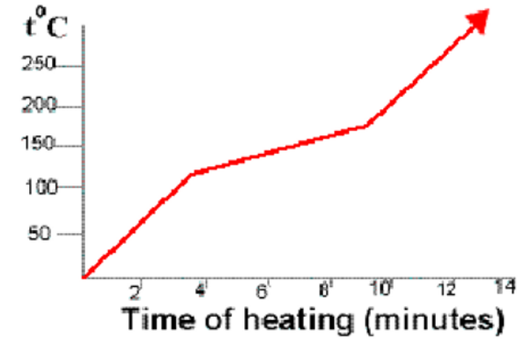
1. States of matter
2. Mixtures
3. Filtration and crystallisation
4. Paper chromatography
5. Distillation
6. Core practical – investigating inks (CP7)
7. Drinking water

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

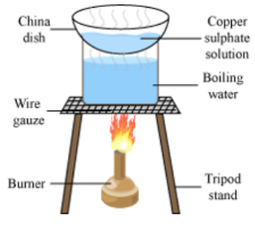
****Heating curve for a pure substance**	Temperature rises as you heat a solid, levels out as it melts, continues rising once fully liquid, levels out whilst boiling and rises again once fully gas.

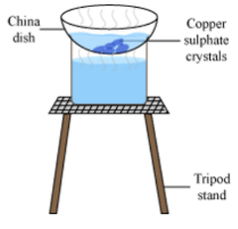


2. Mixtures	
***Element**	A substance made from only one type of atom.
***Compound**	A substance made from two of more different elements bonded together.
***Mixture**	A substance made of two of more substances (elements or compounds) mixed but not bonded together.
****Melting point of mixtures**	Mixtures 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.

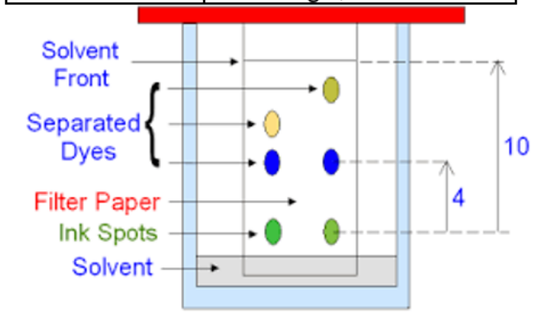


3. Filtration and crystallisation	
***Dissolve**	When a substance mixes with a liquid by breaking down into individual particles (atoms or molecules).
***Soluble**	When a substance can be dissolved by a liquid.
***Insoluble**	When a substance can't be dissolved by a liquid.
***Filtration**	A method of 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.

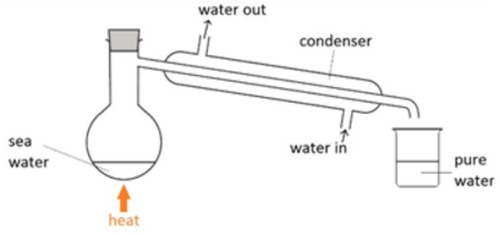


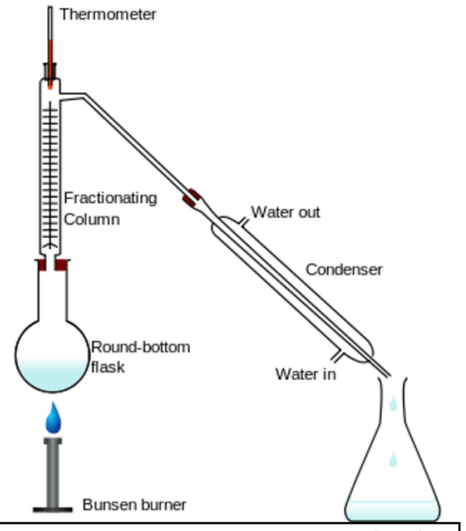


4. Paper chromatography	
***Paper chromatography**	A method of separating out mixtures of liquids to show what is in them, by letting them travel up a piece of chromatography paper.
***Chromatography method**	1. Draw pencil line on paper 2. Place sample spot on line 3. Place paper in solvent, with solvent 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.

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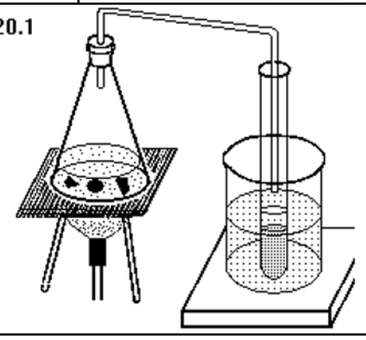


7. Drinking water	
***Potable water**	Water that is safe to drink.
***Desalination**	Producing pure water from seawater.
****Purifying seawater**	The seawater is distilled: heating the water to produce water vapour and condensing it back to liquid. Uses lots of energy.
****Uses of pure water**	Pure water 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.

Science Knowledge Organiser

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

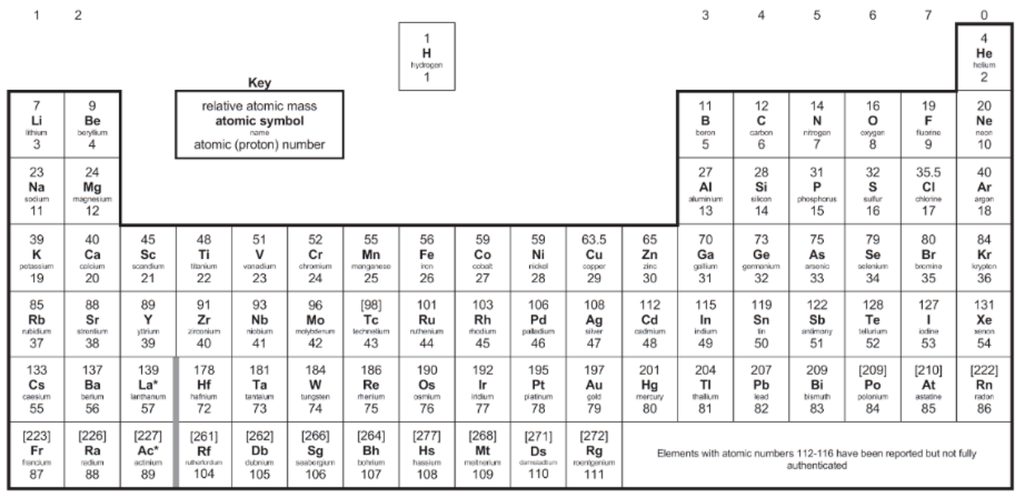
2. Detailed structure of atoms	
****Alpha particle**	Small positively charged particle made of two protons and two neutrons.
****Scattering**	When particles bounce back or change direction.
****Rutherford's experiment**	Fired alpha particles at gold leaf, used a phosphor-coated screen to track where 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.



Science Knowledge Organiser

P1: Motion

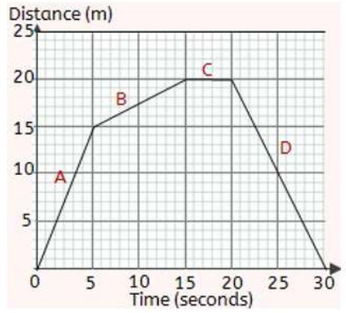
Lesson sequence

1. Vectors and scalars
2. Speed-time graphs
3. Distance-time graphs
4. Acceleration
5. Velocity-time graphs

1. Vectors and scalars	
Magnitude	A scientific word for size.
Scalar quantity	A quantity with magnitude (but no direction).
Scalar examples	Distance – 10 m Speed – 25 m/s Mass – e.g. 50 kg
Vector quantity	A quantity with magnitude and direction.
Vector examples	Displacement – 10 m north Velocity – 25 m/s east Force – 30 N left Acceleration – 3 m/s^2 south Momentum – 400 N m/s right
Vector arrows	Vectors can be represented by arrows, with the length of the arrow representing the magnitude.
Displacement	The distance and direction travelled in a straight line.
Velocity	Your speed in a certain direction.

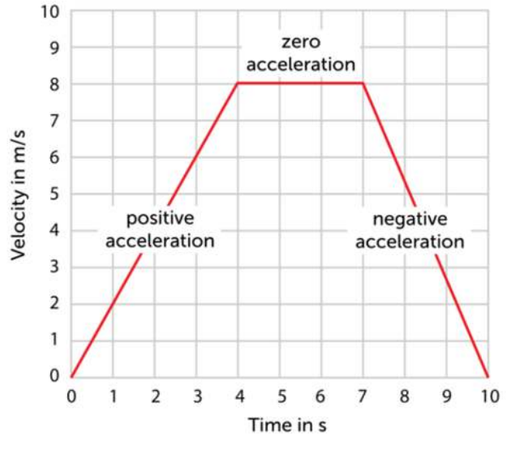
2. Speed	
Units of speed	Metres per second, m/s.
Speed – word equation	Speed = distance / time Speed = m/s Distance = m Time = s
Speed – symbol equation	v = x/t v = speed x = distance t = time
Instantaneous speed	Speed at a particular point in time.
Average speed	The average speed across the whole of a journey, calculate from v = x/t.
Calculating distance travelled – word equation	Distance = average speed x time x = v x t Distance = m Average speed = m/s Time = s
Measuring speed	Measure the distance between two points and time how long an object takes to pass, then calculate using v = x/t.
Light gates	Equipment that can be used for measuring time accurately with fast-moving objects to help find their speed.
Some typical speeds	Walking – 1-2 m/s Running – 3-8 m/s Cycling – 5-20 m/s Driving – 10-40 m/s Flying – 250 m/s

3. Distance-time graphs	
Distance-time graph	A graph describing how your distance from the start changes over the course of a journey. Time is on the x-axis and distance on the y-axis.
Distance-time graphs – stationary	Horizontal line
Distance-time graphs – constant speed	Forwards – line sloping up Backwards – line sloping down
Distance-time graphs – line gradient	Steeper line = faster
Calculating speed from a distance-time graph	Speed = change in distance / change in time Speed = change in y / change in x



4. Acceleration	
Acceleration	Changing velocity
You accelerate when…	- You change speed - You change direction
Units of acceleration	Metres per second squared, m/s^2
Positive and negative acceleration	Positive acceleration = speeding up Negative acceleration = slowing down
Deceleration	Slowing down, negative acceleration.
Acceleration – word equation	Acceleration = change in speed / time Acceleration = m/s^2 Change in speed = m/s Time = s
Acceleration – symbol equation	a = (v – u)/ t a = acceleration v = final speed u = initial speed t = time
Linking acceleration and Velocity travelled	Use the equation: x = (v^2 – u^2) / 2a x = Velocity travelled a = acceleration v = final speed u = initial speed
Acceleration during free fall	10 m/s^2

5. Velocity-time graphs	
Velocity-time graph	A graph showing how your velocity (speed) changes over time. Time is on the x-axis, velocity is on the y-axis.
Velocity-time graphs – constant speed	Horizontal line
Velocity-time graphs – acceleration	Speeding up – line sloping up Slowing down – line sloping down
Velocity-time graphs – Stationary	Horizontal line on the x-axis
Velocity-time graphs – line gradient	Steeper line = greater acceleration
Calculating acceleration on a velocity-time graph	Acceleration = change in velocity/ change in time Acceleration = change in y / change in x
Calculating distance travelled from a velocity-time graph	Distance = area under the graph. Divide the graph into rectangles and triangles, find the area of each and add them together.



Science Knowledge Organiser

P2: Forces and motion

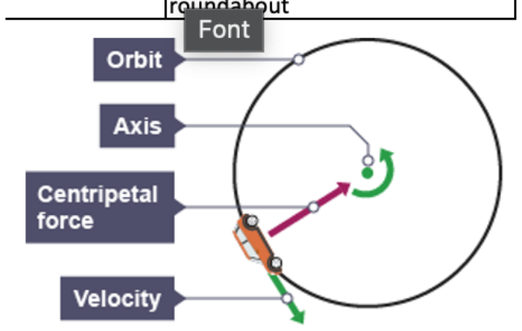
Lesson sequence

1. Resultant forces
2. Newton's first law
3. Mass and weight
4. Newton's second law
5. Core practical – investigating acceleration (CP12)
6. Newton's third law
7. Momentum (HT)
8. Stopping distances
9. Car safety

1. Resultant forces	
***Scalar quantity**	A quantity with magnitude (but no direction).
***Vector quantity**	A quantity with magnitude and direction.
***Force arrows**	Arrows can be used to represent forces: - Direction = direction of force - Length = size of force
****Resultant force**	The force left over when forces acting in opposite directions are cancelled out.
****Calculating resultant force**	Subtract the total force in one direction from the total force in the other direction.
***Balanced forces**	When the resultant force is zero (because forces acting in opposite directions are the same size).
***Unbalanced forces**	When the resultant force is non-zero (because there is more force in one direction than another).

2. Newton's first law	
***Newton's first law of motion**	An object will move at the same speed and direction unless it experiences a resultant force.
****The effect of resultant forces**	Resultant forces cause acceleration: speeding up, slowing down or changing direction

****Effect of forces on motion**	Forces make you start moving, stop moving or change direction, they are not needed to keep you moving!
*****Circular motion**	Moving in a circle is a type of acceleration because you are changing velocity (your direction changes even if your speed does not).
*****Centripetal force**	A force acting towards the centre of a circle that enables objects to move in a circle.
*****Sources of centripetal force**	Gravity – keeps the Earth orbiting the sun Tension – lets a bucket swing in circles on a rope Friction – keeps cars turn round a roundabout



3. Mass and weight	
***Mass**	The quantity of matter in an object is made of. Units = kilograms, kg.
***Weight**	A force caused by gravity pulling downward on an object. Units = newtons, N.
***Force meter**	An instrument for measuring forces. They usually involve a spring that stretched more the more the force.
****Gravitational field strength**	The strength of gravity, which is different on different planets. Units = newtons per g=kilogram, N/kg.
****Gravitational field strength on Earth**	10 N/kg

****Calculating weight**	Weight = mass x gravitational field strength W = m x g Weight = N Mass = kg Gravitational field strength = N/kg
****Air resistance**	A force greater by the air pushing against you as you move. Faster movement → greater air resistance.
*****Motion whilst falling**	Accelerate until the air resistance is equal to the weight; now there is no resultant force so speed stays constant.

4. Newton's second law	
***Newton's second law of motion**	Force = mass x acceleration
****Acceleration is greater when…**	- The force is greater - The mass is smaller
***Calculating forces**	Force = mass x acceleration F = m x a Force = N Mass = kg Acceleration = m/s^2
***Calculating acceleration**	Acceleration = mass / force a = F / m Force = N Mass = kg Acceleration = m/s^2
*****Inertial mass**	The mass calculated by measuring the acceleration produced by force, using the equation 'm = F / a'
*****The point of inertial mass**	Inertial mass is the same as mass measured with a mass balance, but it gives us a way to measure mass where there is no gravity, such as in space.

5. Core practical – investigating acceleration (CP12)	
***CP12 - Aim**	To investigate how changing force changes acceleration.
***CP12 - Setup**	A trolley on a ramp with 90 g masses. 10 g mass hanger attached to trolley via a string over a pulley.
***CP12 – Data collection**	Release the trolley, use light gates to measure the acceleration.
***CP12 – Variations**	Move 10 g of mass from the trolley to the mass hanger each time.
***CP12 – Independent variable**	The force: each 10 g mass = 0.1 N force
***CP12 - Results**	Ore mass → more force → greater acceleration.

6. Newton's third law	
***Newton's third law**	For every action force there is an equal but opposite reaction force.
***Action force**	The force you push or pull with.
***Reaction force**	A force of the same size but opposite direction to an action force.
***Action-reaction forces**	If, A applies an action force to B, B applies a reaction force of same size and opposite direction to A.
****Action-reaction vs balanced forces**	Similarities: same sizes, opposite directions Differences: balanced forces act on same object, action-reaction act on different objects
*****Action-reaction forces - collisions**	E.g. kicking a ball: the foot pushes the ball, the ball pushes back on the foot.

7. Momentum (HT)	
***Momentum**	The tendency of an object to keep moving.

***Calculating momentum**	Momentum = mass x velocity field strength p = m x v Momentum = kg m/s Mass = kg velocity = N/kg
Momentum and force calculations	Force = change in momentum / time F = (mv – mu)/t Force = N Mass = kg Velocity = m/s Time = s
***Conservation of momentum**	Total momentum before and after a collision is the same.

Three car safety features	Crumple zones, (stretchy) seat belts, air bags
***Collision forces**	Greater momentum change → greater force
Calculating collision forces	Force = change in momentum / time F = (mv – mu)/t Force = N Mass = kg Velocity = m/s Time = s

8. Stopping distances	
***Stopping distance**	The distance travelled from when a hazard is seen to when you fully stop.
***Thinking distance**	The distance travelled from when a hazard is seen to when you brake.
***Braking distance**	The distance travelled from when you brake to when you fully stop.
Calculating stopping distance	Stopping distance = thinking distance + braking distance
Thinking distance and reaction time	Slower reactions = greater thinking distance
**Thinking distance increased by…	Higher speed, tiredness, illness, drugs, distractions, old age
**Braking distance increased by	Higher speed, poor brakes, poor tyres, wet/icy/gravelly road, downhill, heavier load

9. Crash hazards	
**Crash danger	Crashes involve large decelerations, creating large forces which can injure you.
**Car safety features	Increase the time a collision takes, reducing deceleration and forces.

Science Knowledge Organiser

B3: Genetics

Lesson sequence

1. Meiosis
2. DNA
3. DNA extraction
4. Alleles
5. Inheritance
6. Gene mutation
7. Variation

1. Meiosis	
***Gametes**	Egg cell and sperm cell
***Fertilisation**	Sperm cell fuses with egg cell and nuclei combine
***Zygote**	Single cell formed by fertilisation
***Gene**	Length of DNA coding for a protein. Controls your characteristics
***Genome**	All the DNA and genes in an organism
***Protein**	Polymer made from amino acids
****Polymer**	Long molecule made by chaining together many shorter ones
***Diploid**	A cell with 23 pairs of chromosomes (46 in total)
***Haploid**	A cell with 23 single chromosomes
***Meiosis**	Cell division that makes gametes
****Meiosis stages**	DNA replicates, cell divides into 2 diploid cells, these divide into 4 haploid daughters.
****Why gametes are different**	Chromosomes in a pair are slightly different. Different gametes get different combinations of chromosomes.

2. DNA	
***Chromosome**	Large DNA molecule made into a small package by tightly coiling DNA around a protein.
***DNA structure**	Two strands, double helix, complementary base pairs, sugar-phosphate backbone
***DNA bases**	Adenine, A; thymine, T; cytosine, C; guanine, G
***Complementary base pairs**	A pairs with T C pairs with G
****Hydrogen bonds**	Weak force holding the two strands of DNA together.
****DNA analysis**	Uses small differences in DNA to determine family relationships or link people to crimes.

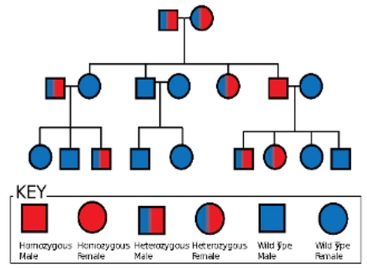
3. DNA extraction	
***DNA extraction: Mix water, salt and detergent.**	Salt makes DNA clump together, detergent breaks down cell membranes to release DNA
***DNA extraction: Mash fruit/veg and add the solution**	Increases the surface area
***DNA extraction: Leave in water bath at 60°C**	Heat makes it react quicker
***DNA extraction: Filter the mixture and collect filtrate**	To remove unwanted lumps
***DNA extraction: Measure out 10 cm^3 of filtrate**	It's easier to work with a small amount
***DNA extraction: Add two drops of protease solution**	Protease breaks down proteins around the DNA
***DNA extraction: Gently add ice-cold ethanol**	DNA is insoluble in ethanol so precipitates
***DNA extraction: Leave for several minutes**	So white DNA layer forms

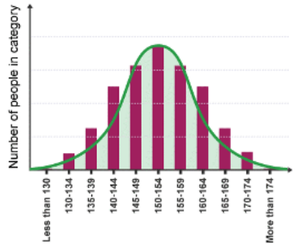
4. Alleles	
***Allele**	Different version of the same gene. We have two alleles of each gene.
****Homozygous**	We have two copies of the same allele
****Heterozygous**	We have two different copies of an allele
***Dominant allele**	One copy needed for characteristic to show. Written as a capital.
***Recessive allele**	Two copies for the characteristic to show. Written as lowercase.
***Genotype**	The combination of alleles in an organism.
***Phenotype**	The characteristics produced by the alleles.
****Genetic diagram**	Shows the likelihood of offspring produced by parents with certain genotypes

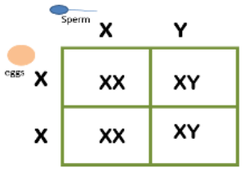
5. Inheritance	
***Sex chromosomes**	Female: XX Males: XY
***Inheriting sex**	All eggs are X, 50% of sperm are X and 50% are Y, so 50% of zygotes are XX and 50% are XY
***Punnett squares**	Uses the genotypes of male and female gametes to predict the genotypes of the offspring.
****Probability and Punnett squares**	Punnett squares tell you the likelihood of certain offspring, not what will actually happen.
****Cystic fibrosis**	Illness caused by a inheriting two copies of a faulty recessive allele.
****Family pedigree chart**	Chart showing how genotypes are inherited down through a family.

6. Gene mutation	
***Mutation**	A change to the bases in a gene.
****Effect of mutations**	Change the structure of a protein and how it works. Sometimes harmless, normally harmful, very rarely beneficial
***Cause of mutations**	Mistakes copying DNA during cell division, DNA damage from chemicals or radiation
***Inheriting mutations**	Only if they occur in gametes (egg and sperm)
***Human Genome Project**	(HGP) Project involving many scientists from many countries to find the order of bases in human DNA
****How is the HGP useful?**	To tailor drugs to genes, to design better drugs
****Genetic differences**	HGP found 99% of DNA in all people is identical.

7. Variation	
***Variation**	Natural differences between members of a species that affect the chance of survival.
***Genetic variation**	Variation caused by genes
***Environmental variation**	Caused by interaction with the surroundings – such as food, climate etc.
***Causes of most variation**	A combination of genes and the environment.
****Acquired characteristics**	Changes caused by the environment during your lifetime, such as losing a leg
****Continuous variation**	Can be anywhere within a range, such as height , following a normal distribution.
****Discontinuous variation**	Can be only one of a few possibilities, such as blood type: A, B, AB, O
****Normal distribution**	Bell-shaped curve with more in the middle and fewer either side.



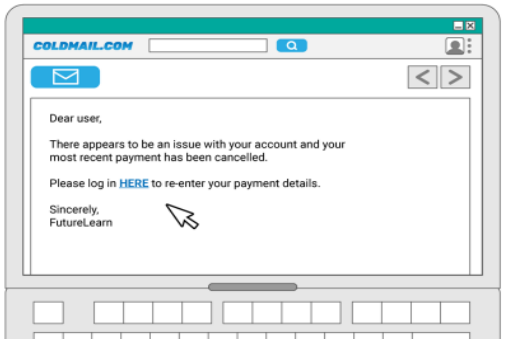




Computer Science Knowledge Organiser

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.
Data: raw facts and figures
Information: data that has been processed and has context

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

have unauthorised access to computer material

have unauthorised access with intent to commit or facilitate the commission of further offences

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

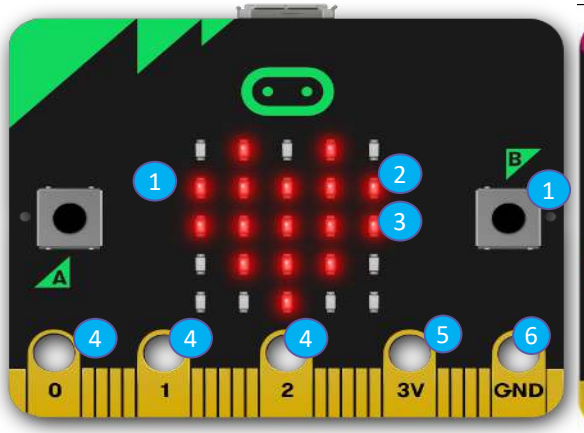
Penetration testers (pen testers) are people who are paid to legally hack into computer systems with the sole purpose of helping a company identify weaknesses in their system.

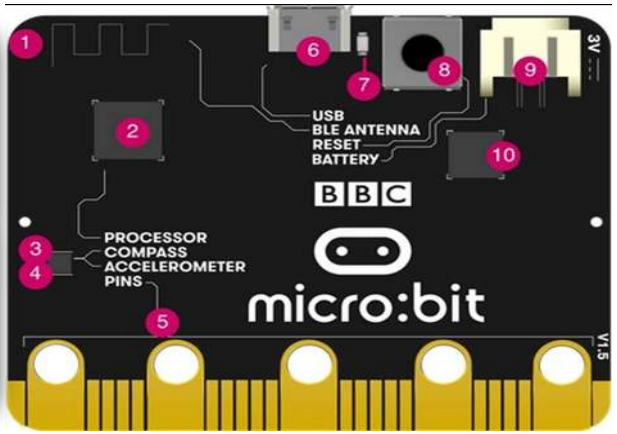
Computer Science Knowledge Organiser

MICRO-BITS

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
MicroPython	The programming language
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.

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.





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**

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

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

Function and features of cloud computing

Function	Feature
Software as a service (SaaS)	Easy access
Infrastructure as a service (IaaS)	Cost-effectiveness
Platform as a service (PaaS)	Security
	Scalability
	On-demand self-service

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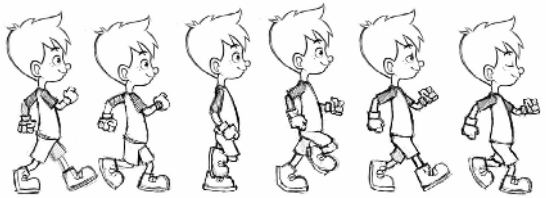
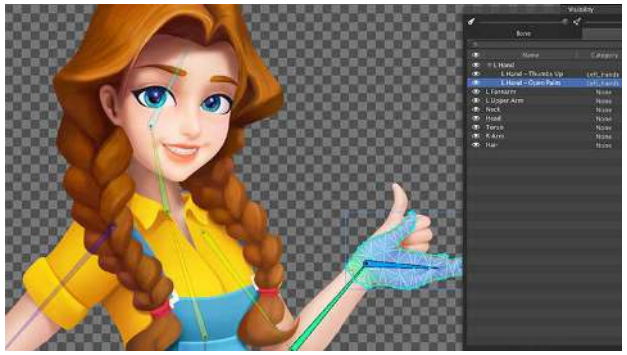


BLENDER - MEDIA ANIMATIONS

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



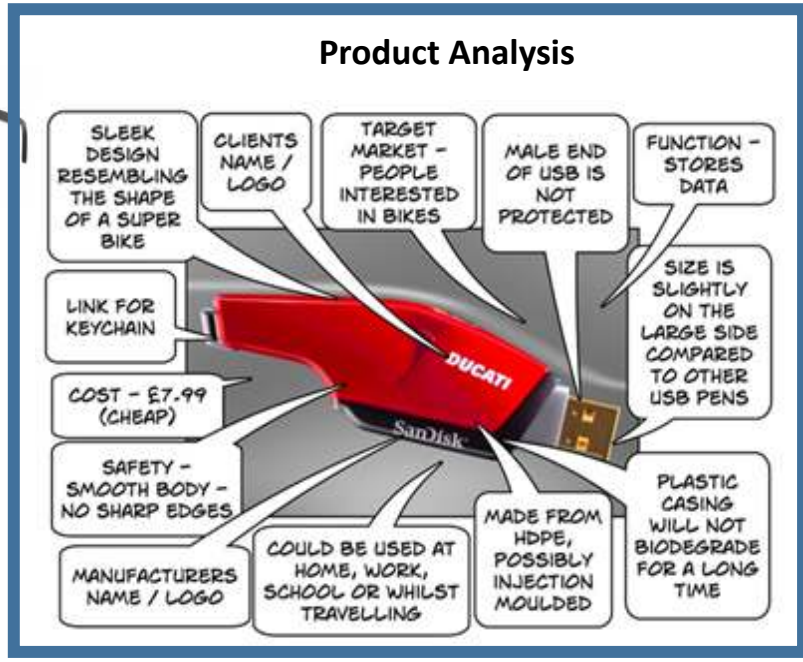
Key words		
add	colour	cut
edge	knife tool	extrude
face	keyframe	focus
edit	vertex	location
loop	tweening	object
organic	proportional	rotate
render	ray tracing	scale
timeline	subdivision	mode

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

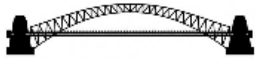
Smart Materials

Type	Smart Property	Uses
Thermochromic pigments	Change colour with temperature	Plastic strip thermometers Mugs or spoons that change colour when hot Test strips on batteries
Photochromic pigments	Change colour with light	Lenses in sunglasses that get darker as the light gets brighter Security markers that can only be seen in UV light
Shape Memory Alloy (SMA)	If bent, will return to their original size when heated.	Spectacle frames Sensors in fire sprinkler systems Electric door locks

Product Analysis



Modern Materials

Type	Properties	Uses
Graphene	Hard and extremely strong Good conductor Flexible	Solar cells Ink that conducts electricity In the future it could be used to develop flexible technology
Composite **Glass Reinforce Polymer** *Fibreglass*	The polymer is flexible and the glass fibres are strong but brittle. Together they make a composite that is tough and strong.	Hulls of boats 
Composite **Carbon Reinforced Polymer**	Polymers are reinforced with carbon fibres making it extremely strong.	Crash helmets Frames for high performance racing bikes Racing cars 
Composite **Reinforced Concrete**	Cement has good compressive strength but poor tensile strength. This is reinforced with steel bars which have good tensile strength.	Construction of buildings and bridges 

Nanomaterials are tiny particles of 1 to 100 nanometres (nm) that can be used in thin films or coatings such as the oleophobic coatings on smartphone screens that repel greasy fingerprints, or hydrophobic materials that repel water.

Design & Technology Knowledge Organiser

2

FERROUS	Properties	Uses	Products
Cast iron	Cheap to produce, easy to cast, is rigid, has high compressive strength, machines and absorbs vibrations well, has low tensile strength, it is brittle and cannot be forged	Pans, brake discs, large castings	 
High-carbon steel (tool steel)	Hard but brittle, less malleable than mild steel, good electrical and thermal conductivity	Taps and tools, eg screwdrivers and chisels	
Low-carbon steel (mild steel)	Ductile and tough, easy to form, braze and weld, good electrical and thermal conductivity but poor resistance to corrosion	Nuts, bolts, screws, bike frames and car bodies	 

NON FERROUS	Properties	Uses	Products
Aluminium	Light in weight and malleable but strong, a good conductor of heat and corrosion resistant	Drink cans, saucepans, bike frames	 
Copper	An excellent electrical conductor of heat and electricity, extremely malleable and can be polished, oxidises to a green colour	Plumbing fittings and electrical wires, professional chef's saucepans	 
Silver	A precious metal that is soft and malleable when heated, highly resistant to corrosion and an excellent electrical conductor of heat	Jewellery	

ALLOYS	Properties	Uses	Products
Brass (alloy of copper and zinc)	Non-ferrous metal that is strong and ductile, casts well and is gold coloured but darkens when oxidised with age, a good conductor of heat	Taps, screws, castings, locks and doorknobs	 
Bronze (alloy of copper, aluminium and/or nickel)	Non-ferrous alloy, harder than brass and corrosion resistant, reddish/yellow in colour	Castings, bearings	
Stainless steel (alloy of steel also with chromium, nickel and magnesium)	Ferrous metal that is silver when polished, hard and tough with excellent resistance to corrosion	Cutlery, sinks, saucepans, surgical equipment	

Design & Technology Knowledge Organiser

3

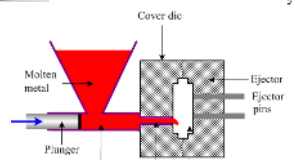
Manufacturing Methods

Natural and Manufactured Timbers	Metal	Polymer	Paper and Boards
Steam Bending Vacuum Press	Injection Moulding Extrusion	Injection Moulding Extrusion Blow Moulding Vacuum forming	Die Cutter Lithography Printing Screen Printing

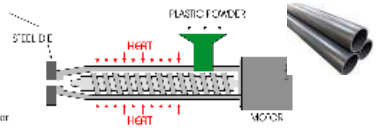
Scales of Production

	Advantages	Disadvantages
One off	High-quality craftsmanship, prototypes can be tested	Expensive, requires specialist labour, time consuming
Batch	Volumes are made for demand which reduces waste, templates and jigs can reused to produce identical products	Downtime between batches
Mass	High volumes can be produced, materials can be bulk purchased at cheaper rates, low-skilled workforce required	Expensive to set up because of specialised equipment, expensive machinery repairs
Continuous	24/7 production using an automated system, high volumes can be produced, materials can be bulk purchased at cheaper rates, low-skilled workforce required	Expensive to set up because of specialised equipment, expensive machinery repairs

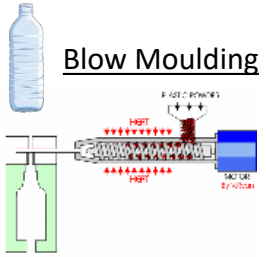
Die Casting



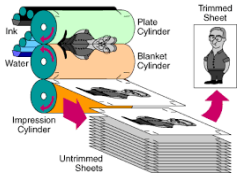
Extrusion



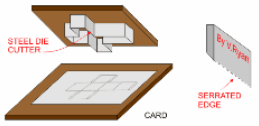
Blow Moulding



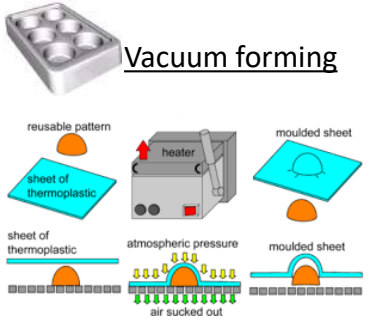
Lithography



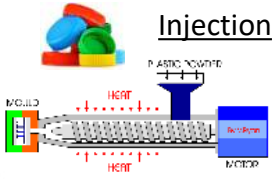
Die Cutter



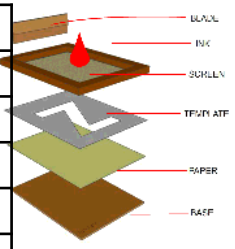
Vacuum forming



Injection



Screen Printing



6Rs		
	Refuse	Is the product necessary?
	Rethink	Are there alternative materials or design options that are more sustainable?
	Reduce	Can the product be made from fewer materials? Can the amount of unsustainable materials be reduced?
	Reuse	Can parts of the product be reused in a different product?
	Recycle	Can the materials used be recycled? If the product made from recycled materials?
	Repair	Can the product be repaired rather than being thrown away if it breaks?

Design & Technology Knowledge Organiser

4

CAD	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
CAM	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

Ergonomics and Anthropometrics

Anthropometrics is the practice of taking measurements of the human body and provides categorised data that can be used by designers. Anthropometrics help designers collect useful data, eg head circumferences when designing a safety helmet. In this example, as there is a large variation in size, the designer would need to build some adjustment into the safety helmet design.

Ergonomics can incorporate the use of **anthropometric data** when designing products to improve the user experience. If a designer doesn't use anthropometric data during the design process, it can lead to a poor user experience that causes discomfort, pain and potential injury. **Ergonomics** is a consideration that leads to a product being designed in a way to make it easy to use. Size, weight, shape, position of buttons and controls are all aspects that contribute to it being ergonomically designed.

Market Pull and Technology Push

Market Pull is when a new product is produced in response to demand from the market.

Technology Push is when a development in materials, components or manufacturing methods leads to the development of a new product.

Life Cycle Analysis

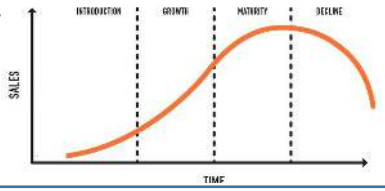
A **Life Cycle Analysis** is carried out to assess the environmental impact of a product during its entire life, from cradle-to-grave. It looks at use of materials, use of energy, impact of transporting the materials and the parts of the product at various points in its life.

1. **Supply Raw Material**
2. **Transport**
3. **Manufacture**
4. **Package**
5. **Use**
6. **Disposal**

Product Life Cycle

The Product Life Cycle describes the four stages a product goes through from its initial introduction to the market until it is replaced or withdrawn because it is not selling well enough

1. **Introduction**
2. **Growth**
3. **Maturity**
4. **Decline**



Design & Technology Knowledge Organiser

5

James Dyson

Key Facts

- Dyson is best known for is dual cyclone technology
- He invented the bagless vacuum prevents poor suction
- The Dyson Air blade dries hands in just 10 seconds and uses
- around 80% less electricity than conventional hand dryers. It has a sheet of unheated air traveling at 400 mph
- He developed the bladeless fan that creates smooth air flow
- He has developed several products using the **latest technology** and at the same time **reducing impact** on the environment by designing them so they use **less energy.**
- Parts to each of his products are easily replaced and fixed so they do not have to be thrown away.

Philippe Starck

Key Facts

- He is inspired by the organic in order to create technologies better adapted to humans – biomimicry
- He uses sustainable materials in his design
- His designs are made from recycled and re-used plastic
- He uses new technologies in his design
- He sees products as extension of the human body
- He creates products with the perfect balance between design and functionality
- He combines technology and an environmental approach.
- His use of industrial practices to manufacture his products

Primary Research	Data gathered first hand directly from the client
Secondary Research	Data about the client that comes from a second hand source
Product Analysis	Looking at a product in detail to understand more about it using ACCESS FM
Design Brief	A summary of the design opportunity
Design Specification	A document that lists all the design criteria that the finished product must meet.
Design Development	Involves making a model of a design, which is then tested and evaluated. A new, improved prototype is made and the process is repeated until the finished design meets all the needs and wants of the client.
Testing	To check that the product meets the design specification and the needs of the user.
Evaluation	Where a designer reflects on the design of a product, looks at what went well during testing and identifies ways that a product could be improved.

Key Words and Definitions

Sustainability	The level to which resources can be used without them becoming unavailable in the future.
Carbon Footprint	Carbon foot print is the measurement/amount of greenhouse gases produced in the production of products.
Renewable Energy Source	A source that is quickly replaced by natural means and will not run out.
Non Renewable Energy Source	A source that cannot quickly be replaced and will eventually run out.

Food Technology Knowledge Organiser

FOOD CHOICES
What makes us choose?

- Special occasions
- Culture
- Likes and dislikes
- Time of day
- Morals
- Health conditions
- Age
- Cost
- Religion

- Some people will make food choices based on their 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

Types of vegetarians

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

Key words

1. Kosher
2. Halal
3. Vegetarian
4. Ovo-lacto vegetarian
5. Vegan
6. Lacto vegetarian
7. Ethical
8. Diabetes
9. Coeliac
10. Gluten
11. Protein
12. Malnutrition
13. Lactose intolerance
14. Allergy
15. Anaphylaxis
16. Epi pen

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

Nutrient Needs of Teens

Nutrient	Reason	Example Foods
Protein	Cope with growth spurts. Boys muscular tissue develops	Omelettes, chicken
Iron	Girls lose iron during menstruation and could become anaemic if not replaced. Vit C helps absorb iron.	Spinach, beef
Vitamin C		Peppers, strawberries
Calcium	Skeleton grows rapidly. These nutrients helps skeleton reach peak size and bone density.	Milk, yogurt, kale, tofu
Vitamin D		Tuna, salmon, mackerel

Food Technology Knowledge Organiser

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.

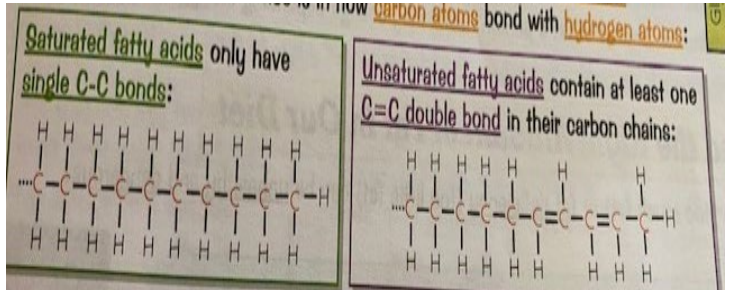
To reduce the outcome of CVD it is important to follow dietary guidelines and eat a diet that is low in saturated fat and instead eat foods higher in unsaturated fat such as oily fish, nuts and seeds, olive oil and the recommended 5-a-day of fruit and vegetables.

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.

Saturated fat: solid at room temperature, mainly animal foods sources include:
fatty cuts of beef, pork, and lamb
dark chicken meat and poultry skin
high fat dairy foods (whole milk, butter, cheese, sour cream, ice cream), tropical oils (coconut oil, palm oil, cocoa butter)lard
Unsaturated fats: Liquid at room temperature, vegetable sources, includes mono and polyunsaturated fats.



Food Technology Knowledge Organiser

Making a Roux Sauce

Food Science Topics

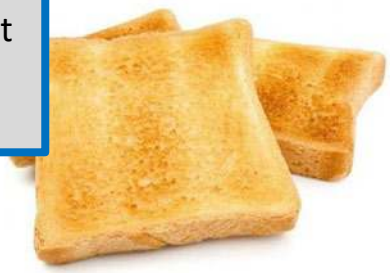
Keywords

1. Gelatinisation
2. Viscosity
3. Consistency
4. Dextrinisation
5. Caramelisation

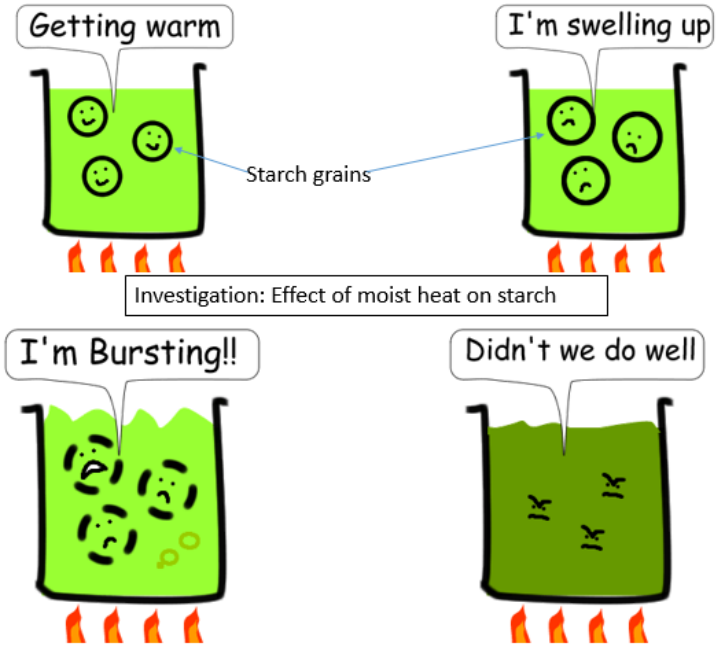
LOVE FOOD LOVE SCIENCE

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

Dextrinisation 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)



Macro-nutrients (are those nutrients we need in large amounts . They all provide us with energy)



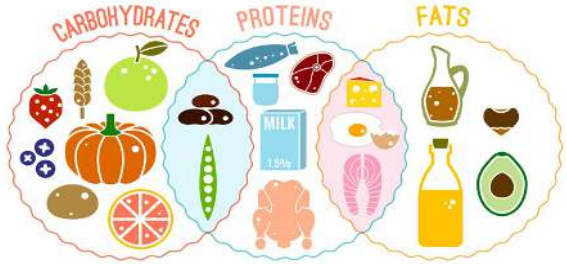
Investigation: Effect of moist heat on starch

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.

Carbohydrates

Starch
Sugars
Dietary fibre



Chemical formula for **glucose** : $C_6H_{12}O_6$

Sugars : Monosaccharide
Disaccharide
Polysaccharide

Food Technology Knowledge Organiser

Key Words

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: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 salami).

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

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

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

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

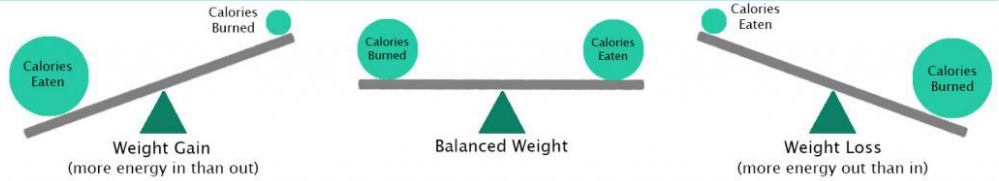
Sources:
Carbohydrate: foods containing sugar and starch (1g of carbohydrates = 3.75 /4 kcals of energy)

Fat: foods containing visible and invisible fats and oils. (1g of fat = 9 kcals of energy)

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

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.



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.

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%

Art – Tier 2 and Tier 3 language

SPRING 1: ART: Concept Art	Type	Keyword	Definition
	Tier 2 language	Prototype	An experimental process where the artist implements ideas into a final format.
		Hybrid	a thing made by combining a few different elements.
		Adaptation	The dynamic evolutionary process that fits organisms to their environment.
		Proportion	How the sizes of different parts of a piece of art or design relate to each other.
		Tonal	The range between light and dark or one colour to another.
	Tier 3 language	Mixed Media	A term used to describe artworks composed from a combination of different media or materials.
		Scumbling	A shading technique achieved by overlapping lots of little circles.
		Hatching	An artistic technique used to create tonal or shading effects by drawing closely spaced parallel lines.
		Cross-hatching	When the hatching lines are placed at an angle to one another, it is called cross-hatching.
		Mark Making	The different lines, dots, marks, patterns, and textures we create in an artwork.

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

Computer Science – Tier 2 and Tier 3 language

SPRING 2: COMPUTER SCIENCE: Cybersecurity

Type	Keyword	Definition
Tier 2 language	Virus	Self-replicating software attached to another program/file.
	Encryption	Mathematically converts data into a form that is unreadable without a key.
	Biometrics	'Password' created from the user fingerprint, iris, retina, facial or voice.
	Authentication	Verifying the identity of a user or process.
	Hacking	Gaining unauthorised access to or control of a computer system.
Tier 3 language	Malware	A variety of forms of hostile or intrusive software.
	Phishing	Messages designed to steal personal details/money/identity.
	Trojans	Masquerades (pretends) as having a legitimate purpose but actually has malicious intent.
	Shouldering	Directly observing someone enter personal details e.g. PIN number or password.
	Blagging	Inventing a scenario to obtaining personal information.

SPRING 1: COMPUTER SCIENCE: HTML

Type	Keyword	Definition
Tier 2 language	Multimedia	Content that uses a combination of different types of media – text, audio, images.
	Website	A collection of webpages with information on a particular subject.
	Webpage	A hypertext document connected to the world wide web.
	Navigation	The elements of a website that allows the user to move around the website.
	JPG/PNG	JPG – main file used for images on WWW. PNG – another image file used on WWW.
Tier 3 language	Hyper text mark-up language (HTML)	Describes and defines the content of a webpage.
	Uniform resource locator (URL)	An address that identifies a particular file or webpage on the internet.
	Hyperlink	A link from a hypertext document to another location, activated by clicking on a highlighted word or image.
	Hotspot	An area on a computer screen which can be clicked to activate a function, especially an image or piece of text acting as a hyperlink.
	Web script	A type of computer programming language used to add dynamic features to a webpages.

Computer Science - Tier 2 and Tier 3 language

SPRING 2: COMPUTER SCIENCE: Python	Type	Keyword	Definition
	Tier 2 language	Program	A detailed plan or procedure for solving a problem with a computer.
		Coding	How we communicate with computers.
		Errors	Problems occurring in a piece of code.
		Input	Computer hardware equipment used to provide data and control signals to a computer.
		Data	Facts and figures in their raw form.
	Tier 3 language	Variable	A memory location within a computer program where values are stored.
		Syntax	Errors/mistakes made in the piece of code.
		Iteration	Repeating steps, or instructions , over and over again.
		While loop	When the program needs to repeat actions, while a condition is satisfied.
		Condition	Statements that are created by the programmer which evaluates actions in the program.

SPRING 2: COMPUTER SCIENCE: Mobile App Development	Type	Keyword	Definition
	Tier 2 language	Application	A computer software package that performs a specific function directly for an end user.
		Blocks	Scratch bricks that we can use to code algorithms.
		Execute	A computer precisely runs through the instruction.
		Process	The instance of a computer program that is being executed by one or many threads.
		Output	Data that a computer sends to show the results of a users actions.
	Tier 3 language	Abstraction	Identify the important aspects to start with.
		Algorithm	Precise sequence of instructions.
		Selection	Making choices.
		Computational thinking	Taking a complex problem and breaking it down into a series of small, more manageable problems.
		GUI	Graphical User Interface.

Design & Technology - Tier 2 and Tier 3 language

	Type	Keyword	Definition
SPRING 1: D & T	Tier 2 language	Ecological	Ecological footprint is the impact of human activities measured in terms of the area of biologically productive land and water required to produce the goods consumed and to assimilate the wastes generated.
		Lamination	The process through which two or more flexible packaging webs are joined together using a bonding agent.
		Manufactured	A product produced on a large scale using machinery.
		Composite	A composite material is a combination of two materials with different physical and chemical properties.
		Accuracy	Correct or precise measurements of a product.
	Tier 3 language	Photochromic	Photochromic materials changes colour in response to light intensity changes.
		Thermochromic	Thermochromic material changes colour in response to temperature changes.
		Piezoelectric	Piezoelectric materials are materials that produce an electric current when they are placed under mechanical stress.
		Electroluminescent	Electroluminescent materials (ELs) emit light when an electrical current or voltage is applied to it, or when subject to a strong electric field.
		Geotextiles	Geotextiles are permeable fabrics which, when used in association with soil, have the ability to separate, filter, reinforce, protect, or drain.

	Type	Keyword	Definition
SPRING 2: D & T	Tier 2 language	Collaborative	Collaborative design is a process that brings together different ideas, roles and team members
		Contour	Outlining an image on 2D design to create a cut line.
		Visualisations	Visualisation during design refers to the visual mental images used by the designer during the design process.
		Production	Production methods include one-off, batch and mass. It is the scale at which a product will be manufactured.
	Tier 3 language	Microencapsulation	Scratch and sniff is created through the process of micro-encapsulation. The desired smell is surrounded by micro-capsules that break easily when gently rubbed.
		Lithography	Lithography is a printing process that uses a flat stone or metal plate on which the image areas are worked using a greasy substance so that the ink will adhere to them by, while the non-image areas are made ink-repellent
		Automation	The use of automatically computer controlled equipment or machinery to manufacture products
		Vector	The process of converting from a bitmap image to a vector

Drama - Tier 2 and Tier 3 language

SPRING 1: DRAMA

Type	Keyword	Definition
Tier 2 language	Devising	Creating a performance using your own ideas
	Stimulus	Something used to provide ideas in drama e.g. an image, a poem, a piece of music
	Script	The book that actors read from
	Brainstorm	Discuss ideas as a group
	Dialogue	The words spoken between two or more characters
	Atmosphere	The mood created in a scene
Tier 3 language	Improvise	To create a performance with no prior planning
	Playwright	The person who writes a play/script
	Direct Address	When a character talks directly to the audience
	Tableau	A still image

SPRING 2: DRAMA

Type	Keyword	Definition
Tier 2 language	Plot	The story/what happens in a performance
	Pace	The speed at which an actor speaks – slow/fast
	Pause	A moment of silence, used to build tension
	Tone	The way an actor speaks in order to show the emotion of the character e.g. angrily, happily, excitedly
	Pitch	How high or low an actors voice is
Tier 3 language	Explorative Strategies	Techniques that you can use to gain a deeper understanding of characters, to explore scenes and to experiment with characterisation
	Narration	A spoken commentary for the audience about the action onstage
	Hot-Seating	An actor sits in the hot-seat and is questioned **in role**, spontaneously answering questions they may not have considered before – this deepens an actors understanding of the character
	Marking the Moment	A way of highlighting the most important moment in a scene in order to draw the audience's attention to its significance
	Thought Tracking	When a character steps out of a scene to address the audience about how they're feeling

English - Tier 2 and Tier 3 language

SPRING 1: ENGLISH	Type	Keyword	Definition
	Tier 2 language	Identify	Selecting and choosing something, possible a key word from a text.
		Extract	To take or remove something. Could also be referring to the section of text you are addressing.
		Intriguing	Exciting or interesting.
		Evaluate	To consider the text carefully and provide your opinion, weighing up the limitations but also the positives.
		Prioritising	To choose something in order of importance.
	Tier 3 language	Omniscient Narrator	A narrator who can see everything in the story, and can also describe the thoughts and feelings of all the characters.
		Declarative sentence	A sentence that shows a statement.
		Interrogative sentence	A sentence that asks a question.
		Exclamatory sentence	A sentence reflecting emotion.
		Imperative sentences	A sentence which shows a command.

SPRING 2: ENGLISH	Type	Keyword	Definition
	Tier 2 language	Prejudice	A predetermined opinion that is not based on reason or actual experience
		Equality	Being equal, especially in status, rights, or opportunities
		Perceptions	The way in which something is regarded, understood, or interpreted
		Extract	A short passage taken from a text, film, or piece of music.
		Stereotype	A widely held but fixed and oversimplified image or idea of a particular type of person or thing, eg. Women like to bake.
	Tier 3 language	Accent	A distinctive way of pronouncing a language, especially one associated with a particular country, area, or social class.
		Dialect	A particular form of a language which is peculiar to a specific region or social group.
		Literature	Books and writings published.
		Colonialism	The policy or practice of acquiring full or partial political control over another country, occupying it with settlers, and exploiting it.
		Colloquial	Language used in ordinary or familiar conversation; not formal

Food Technology - Tier 2 and Tier 3 language

SPRING 1: FOOD TECHNOLOGY: Food Science	Type	Keyword	Definition
	Tier 2 language	Rupture	To break or burst suddenly.
		Absorb	To take in or soak up
		Viscosity	The internal friction of a liquid or its ability to resist flow
		Starch	A polysaccharide which forms a key store of energy in plant cells
		Amino acid	A unit from which proteins are constructed.
	Tier 3 language	Dextrinisation	Breaking up of the starch molecules into smaller groups of glucose molecules when exposed to dry heat, eg toast
		Gelatinisation	When starch granules swell when cooked with liquid, then burst open and release the starch, causing the liquid to thicken
		Roux	When a gelatinised liquid is left to cool and it gradually becomes too thick. This is because the starch rearrange itself again to a more crystalline structure
		Syneresis	A liquid such as water is expelled or extracted from a gel. E.g. when a gelatinised sauce is frozen then defrosted and it splits.
		Retrogradiation	When a gelatinised liquid is left to cool and it gradually becomes too thick. This is because the starch rearrange itself again to a more crystalline structure

SPRING 2: FOOD TECHNOLOGY: Diet and Health 1	Type	Keyword	Definition
	Tier 2 language	Intolerant	Unable to be given
		Coeliac	Cannot absorb the protein gluten. Can result in Coeliac disease: a chronic intestinal disorder caused by sensitivity to the protein gliadin contained in the gluten of cereals.
		Vegetarian	A lacto-vegetarian diet includes dairy products and plants, and a lacto-ovo vegetarian diet includes eggs, dairy products and nuts.
		Protein	A macronutrient that is essential to building muscle mass.
		Calories	A unit of measurement of the energy in the foods that you eat
	Tier 3 language	Lactose	A natural sugar found in milk and dairy products.
		Gluten	A mixture of two **proteins** present in cereal grains, especially wheat, which is responsible for the elastic texture of dough.
		Lacto-Ovo	Lacto-ovo-vegetarian diet excludes meat, poultry, and fish but includes eggs and dairy products.
		High Biological Value (HBV)	Protein foods that contain all the essential amino acids
		Kilojoules/Kilocalories	Are units of measurement of energy.

Geography - Tier 2 and Tier 3 language

SPRING 1: GEOGRAPHY: Asia	Type	Keyword	Definition
	Tier 2 language	Population	Is the amount of people that live within an area.
		Dense	An area with a high population
		Sparse	An area with a low population
		Biome	Is an area classified according to the species that live in that location.
		Carbon Footprint	Is the measurement of the impact humans activity has on the environment (and how much CO2 is emitted)
	Tier 3 language	Urbanisation	Is the increase in the proportion of people living in an urban area compared to a rural area.
		Megacity	A city with more than 10 million.
		Flood Plain	Is an area of land which is covered in water when a river bursts its banks.
		Emigrant	Is the process of leaving a country or area (exiting)
		Immigrant	Is the process of moving to a new country. (moving IN)

SPRING 2: GEOGRAPHY: Coasts	Type	Keyword	Definition
	Tier 2 language	Coast	Where the land meets the sea.
		Relief	The height of land above sea level.
		Erosion	The process of wearing away materials.
		Deposition	The process of material being dropped.
		Transportation	The process of material being moved from one location to another.
	Tier 3 language	Swash	Is when waves reach the shore and rush up the beach.
		Backwash	Is the movement of waves down the beach.
		Fetch	How far a wave has travelled
		Discordant	A coastline made of horizontal layers of hard and soft rock.
		Coastal Management	Is a defence against flooding and coastal erosion to protect the coastline.

History - Tier 2 and Tier 3 language

SPRING 1: HISTORY: Turning point WW2

Type	Keyword	Definition
Tier 2 language	Invasion	An instance of invading a country or region with an armed force
	Evacuation	The action of leaving a place
	Aviation	The flying or operating of aircraft
	Supremacy	The state or condition of being superior (higher rank) to all others in authority, power, or status
	Evaluate	To form a judgement on an issue/factor
Tier 3 language	Appeasement	The policy followed by Britain and France after WW1 in which they allowed Hitler to get away breaking the terms of the Treaty of Versailles to avoid conflict.
	Imperialism	An ideology of extending the rule over peoples and other countries, for extending political and economic access, power and control
	Nuclear proliferation	The spread of nuclear weapons, fissionable material, and weapons-applicable nuclear technology
	Axis powers	An alliance between Germany, Italy and Japan
	Luftwaffe	The aerial warfare branch of the Wehrmacht during World War II
	Wehrmacht	The German armed forces

SPRING 2: HISTORY: Holocaust and Genocide

Type	Keyword	Definition
Tier 2 language	De humanisation	To deny the humanity of one group, and associate them with animals or diseases in order to turn people against them.
	Segregation	The action or state of setting someone or something apart from others
	Extermination	Committing mass murder
	Propaganda	Information, especially of a biased or misleading nature, used to promote a political cause or point of view.
	Persecution	Hostility and ill-treatment, on the basis of ethnicity, religion, sexual orientation or political beliefs.
Tier 3 language	Indoctrination	The process of teaching a person or group to accept a set of beliefs (brainwashing)
	Genocide	The deliberate killing of a large number of people from a particular nation or ethnic group with the aim of destroying that nation or group
	Anti Semitism	Hostility to or prejudice against Jewish people
	Kristallnacht	'Night of broken glass' – an event in which Nazis coordinated an attack on Jewish property and people.
	Ghetto	An area of a city kept separate from others. Jewish people were separated away from others.

Maths - Tier 2 and Tier 3 language

SPRING 1: MATHS: Topic name	Type	Keyword	Definition
	Tier 2 language	Measure	A standard unit used to express the size, amount, or degree of something.
		Dimensions	Measurement -in length, width, and thickness.
		Construct	Geometry: to draw/build a figure/ shape accurately following the given specific conditions.
		Adjacent	Very near, next to, or touching.
		Inverse	A term is said to be in inverse proportion to another term if it increases (or decreases) as the other decreases (or increases).
	Tier 3 language	Perpendicular	Meeting a given line or surface at right angles.
		Hypotenuse	The side of a right triangle opposite the right angle.
		Significant figure	All the nonzero digits of a number and the zeros that are included between them or that are final zeros and signify accuracy.
		Compound Interest	Interest paid on both the principal and on accrued interest.
		Multiplier	A number by which another is multiplied

Maths - Tier 2 and Tier 3 language

	Type	Keyword	Definition
SPRING 1: MATHS	Tier 2 language	Factors	A number that divides another number exactly. E.g. 4 is a factor of 12
		Proportional	When quantities have the same **relative** size. In other words they have the same ratio
		Scale factor	How many times larger or smaller an enlarged shape will be.
		Simplify	To make the given expression/fraction/ratio simpler by collecting like terms or cancelling down common factors
		Solve	To calculate the value of any unknown/s
	Tier 3 language	Direct proportion	As one amount increases, another amount increases at the same rate
		Constant of proportionality	The constant value (often written **k**) relating amounts that rise or fall uniformly together
		Annum	A particular amount **per annum** means that amount each year
		Percentage	A fraction expressed as the number of parts per hundred and recorded using the notation %
		Decimal multiplier	Calculate *percentage increases* and *percentage decreases* very quickly, with one single multiplication.

	Type	Keyword	Definition
SPRING 2: MATHS	Tier 2 language	Frequency	How many times something happens. Another word for 'total'
		Grouped data	Data that has been bundled together in categories
		Mean	A type of average found by adding up a list of numbers and dividing by how many numbers are in the list
		Range	The largest number take away the smallest value in a set of data
		Distribution	How data is shared or spread out
		Average	A value to best represent a set of data. There are three types of average - the mean, the median and the mode
		Outlier	A value that "lies outside" (is much smaller or larger than) most of the other values in a set of data.
	Tier 3 language	Discrete data	Data that can only take certain values
		Median	The middle value when a list of numbers is put in order from smallest to largest. A type of average.
		Mode	The most common value in a list of numbers. If two values are tied then there is two modes. A type of average

MFL - Tier 2 and Tier 3 language

SPRING : MFL: Topic name	Type	Keyword	Definition
	Tier 2 language	Preterite/Perfect (past) tense	**talk about completed actions at specific times in the past**
		Subordinate clause	has **a subject and a verb**, but it cannot stand alone as a complete sentence. ... Since the sun will shine today (the sun=subject; will shine=verb)
		Adjectival agreement	**the adjective 'agrees' with the noun it's describing in gender and number**
		Intensifier/quantifier	to give force or emphasis, for example *really* in *my feet are really cold*.
		Sequencers	**ords that organize your writing and speaking, words like first** , next , then , after that
	Tier 3 language	WWWWW	**Who What Where When Why**
		TOPCAT	Tenses Opinions Pronouns Conjuctions Adjectival Agreement Translate
		AVOW	Adjective Verb Order of Words
		PALM	People Action Location Mood
		IESAO (fr) SHET (sp)	Il y a - there is Est -is Sont -(They) are A - (he/she/it) has Ont – (they) have Son – (they) are Hay - (there is/ there are) Es ((it) is Tiene) (it) has)

SUMMER : MFL: Topic name	Type	Keyword	Definition
	Tier 2 language	Past participle (fr) prepositions (sp)	he form of a verb, typically ending in *-ed* in English
		Auxillary verb (fr)	verb used in forming the past tense
		Verb ending agreements (être) (fr)	Add an extra –e if feminine, -s if plural and masculine, - es if feminine plural
		Modal verbs	an auxiliary verb that expresses necessity or possibility
		Subordinate Clause	has **a subject and a verb**, but it cannot stand alone as a complete sentence. ... Since the sun will shine today (the sun=subject; will shine=verb)
	Tier 3 language	SAP SEP (fr)	Subject (person) Avoir (Auxillary verb) Past participle Subject (person) Être (Auxillary verb) Past participle
		IESAO (fr) SHET (sp)	Il y a - there is Est -is Sont -(They) are A - (he/she/it) has Ont – (they) have Son – (they) are Hay - (there is/ there are) Es ((it) is Tiene) (it) has)
		TOPCAT	Tenses Opinions Pronouns Conjuctions Adjectival Agreement Translate
		AVOW	Adjective Verb Order of Words
		PALM	People Action Location Mood

Music - Tier 2 and Tier 3 language

SPRING 1: MUSIC: Topic name	Type	Keyword	Definition
	Tier 2 language	**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
		Synchronisation	Bringing sounds together at the correct time
	Tier 3 language	**Ostinati**	Musical repetition
		Counterpoint	Melodies that are against other melodies (played at the same time)
		Polyrhyhms	Many rhythms played at the same time
		Static Harmony	Groups of notes that do not change much
		Motif/cell	A short melody/musical idea
		Metric Displacement	Moving a melody to another art of the beat

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

Religion and Ethics - Tier 2 and Tier 3 language

SPRING 1: RE: Issues of relationships	Type	Keyword	Definition
	Tier 2 language	Roles	Position, status or function of a person in society, as well as the characteristics and social behaviour expected of them
		Responsibilities	Actions / duties you are expected to carry out
		Commitment	A sense of dedication and obligation to someone or something
		Contraception	Methods used to prevent a woman from becoming pregnant during or after sexual intercourse
		Evaluate	To make a judgement on an issue or belief and consider the opposing view
	Tier 3 language	Cohabitation	To live together in a sexual relationship without being married or in a civil partnership
		Sacrament	An outward sign of an inward blessing by God. A ceremony blessed by God, for example marriage
		Divorce	To legally end a marriage
		Adultery	Having sexual relations with someone other than your marriage partner
		Ummah	The Muslim community
		Chastity	The state in which a person does not have sexual relationships before marriage.

SPRING 2: RE: Issues of Human Rights	Type	Keyword	Definition
	Tier 2 language	Prejudice	Pre judging – judging people to be inferior or superior without a cause
		Discrimination	Acts of treating groups of people, or individuals differently, based on prejudice
		Social Justice	Promoting a fair society by challenging injustice and valuing diversity. Ensuring that everyone has equal access to provisions, equal opportunities and rights
		Human Rights	The basic entitlement of all human beings, afforded to them because they are human
		Censorship	The practice of suppressing and limiting access to materials considered offensive or a threat to security. People maybe restricted by censorship laws.
	Tier 3 language	Personal Conviction	Something a person strongly feels of believes in
		Zakah	The third Pillar of Islam, a Muslims duty to give 2.5% of their wealth to charity to support those in need.
		Sadaqah	Islamic term for any good deed done out of compassion or generosity
		Pacifism	The belief and practice of none violence to settle disputes
		Relative poverty	A standard of poverty measured in relation to the standards of society in which a person lives.

Science - Tier 2 and Tier 3 language

SPRING 1: SCIENCE: Physics Topic 1 & 2	Type	Keyword	Definition
	Tier 2 language	Instantaneous	Existing or measured at a particular instant
		Magnitude	Word for “size”
		Motion	Change with time of the position or orientation of an object
		Rate	the speed at which something happens over a particular period of time
		Conservation	Prevention of wasteful use of a resource
	Tier 3 language	Centripetal	A force acting towards the centre of a circle that enables objects to move in a circle
		Displacement	The distance and direction travelled in a straight line
		Velocity	Your speed in a certain direction
		Acceleration	Change of velocity over time
		Momentum	The tendency of an object to keep moving.

SPRING 2: SCIENCE: Biology Topic 4 & Physics Topic 3	Type	Keyword	Definition
	Tier 2 language	Competition	The fight to eat, survive and breed.
		Resistance	The natural ability of some members of a species to survive poisons that would kill the other members.
		Inheritance	Gaining your genes from your parents.
		Dissipation	The way energy spreads out, becoming less useful as it does.
		Insulation	Materials that contain lots of tiny air pockets that prevent heat loss by conduction.
	Tier 3 language	Mutations	Changes in DNA that cause variation.
		Natural selection	Organisms with the best genes and characteristics are more likely to survive, breed and pass on their better genes.
		Genetic engineering	Changing the characteristics of organisms by giving them genes from another organism.
		Joules	The units of energy, symbol = J.
		Conduction	Heat transfer through solids caused by vibrating particles bumping into each other.

Super Learning Day Knowledge Organiser

Be Safe

Bullying and Cyberbullying
Bullying is the repetitive, intentional hurting of one person or group by another person or group, where the relationship involves and imbalance of power. It can happen face to face or online.

Circle of support:

- Individual
- Friends
- School
- Family
- Websites
- Police

If you, or anyone you know needs support in this area, speak to a trusted adult, a teacher, form tutor or head of year. You can also get support from Childline at: https://www.childline.org.uk

Be Respected

Changes in the law regarding LGBT relationships

Previous to 2003 it was against the law to "promote" the acceptability of or teach about LGBT people in schools

Equal marriage act- The passing of this bill allowed same-sex couples to marry in the UK. From 2005, same sex couples could enter into a civil partnership, but this did not offer the same legal rights as marriage does. Previous to this, same-sex couples were not able to form legal partnerships.

Careers

What are gender stereotypes in relation to jobs?

Gender Stereotyping is when there is an assumption that some jobs are more suited to men or women. This can include generalisations about what men and women are good at, what they are capable of doing, and whether a job is 'masculine or feminine'.
Gender stereotyping has lead to a lack of both sexes doing certain jobs, but it has particularly affected women entering careers such as construction, engineering, science and medicines. This is often due to girls being exposed to gender stereotypes from a young age..

How can society address gender stereotypes?

- Invite women from traditionally male careers to talk to students in school.
- Celebrate and recognise women who have succeeded in male dominated industries and jobs.
- Constantly challenge stereotypical views about what men and women are like, and what they are good at.
- Ensure that children are not encouraged towards gender stereotypes from a young age. For example, fancy dress outfits for BOTH genders.
- Celebrate and recognise women who have succeeded in male dominated industries and jobs.

Be Healthy

Drugs and alcohol and their effects

Physical – Prolonged use could lead to sever illness including organ failure, skin conditions, destroy neuro logical pathways. Short term can lead to poor decision making and injury due to loss of balance

Emotional – Change in mood, withdraw from activities and everyday life. Irritable and easily triggered. Extreme highs that can't be matched without the use of drugs and alcohol

Social – Loss of friends

Financial – Debt issues and loan sharking

Legal – Potential arrest for possession
Further Support
www.talktofrank.com/get-help

Be An Active Citizen

Who are the UK political parties?

There are many political parties in the UK. The 3 biggest are The Labour Party, The Conservative Party and the Liberal Democrats. Usually The Conservative Party or The Labour Party win elections and govern the country.
The Conservative Party – right wing, believe a smaller state and low taxation will encourage economic growth. The Conservative Party's voting and financial support base has historically consisted mainly of homeowners, business owners, farmers, real estate developers and wealthier voters, especially in rural and suburban areas of England. Took Britain out of the European Union. Receives significant funding from wealthy individuals. Most newspapers and media platforms campaign to get them elected.
The Labour Party – left wing. Believe big companies and the better-off could pay higher rates of tax to fund better public services (schools, hospitals, benefits, police, fire service) for the public. Historically The Labour Party's support base has mainly consisted of working people particularly in larger towns and cities. Receives significant funding from trade unions.