

Curriculum Companions

Year 8

Term Three

Name:

Tutor Group:



Literacy & Reading Tracker

Bedrock Username: _____ Password: _____

Accelerated Reader Colour: _____







WHY READ?

Reading helps you in **all** aspects of your life. Research shows that young people who read for pleasure between the ages of 10 and 16 have:

- Better self-esteem and higher levels of mental wellbeing and happiness.
- Much better scores in vocabulary, spelling, and maths at age 16 – your GCSE age!
- Active readers are likely to earn up to five times more than those who spend little or no time reading

Bedrock Milestones		Reading for Pleasure – Half Term 1			Reading for Pleasure – Half Term 2		
		Session	Title	Page	Session	Title	Page
Bronze		Week 1	DEAR		Week 1	DEAR	
			Literacy			Literacy	
		Week 2	DEAR		Week 2	DEAR	
			Literacy			Literacy	
Silver		Week 3	DEAR		Week 3	DEAR	
			Literacy			Literacy	
		Week 4	DEAR		Week 4	DEAR	
			Literacy			Literacy	
Gold		Week 5	DEAR		Week 5	DEAR	
			Literacy			Literacy	
		Week 6	DEAR		Week 6	DEAR	
			Literacy			Literacy	
Platinum		Week 7	DEAR		Week 7	DEAR	
			Literacy			Literacy	

English | C19th Non-Fiction | Topic Dictionary

Image	Word	Definition	In a sentence
	Degradation	When something gets worse or falls apart.	<i>The park's degradation was clear when the benches broke and the grass grew tall and messy.</i>
	Deplorable	Really bad or terrible.	<i>The conditions in the old house were deplorable, with broken windows and no running water.</i>
	Destitute	Very poor and without the things you need to live.	<i>After the flood, many families were destitute, with no homes or food.</i>
	Forlorn	Feeling lonely, sad, or hopeless.	<i>The lost puppy looked forlorn, sitting all alone in the rain.</i>
	Industrial	Relating to factories and making things.	<i>The industrial area of the city is full of factories where people make cars and clothes.</i>
	Lamentable	Very sad or disappointing.	<i>It was lamentable to see the broken playground equipment that no one had fixed for years.</i>
	Neglect	When you don't take care of something or someone.	<i>The dog was neglected, and its fur was dirty because no one was taking care of it.</i>
	Prohibit	To say that something is not allowed.	<i>The teacher will prohibit students from using phones during class.</i>
	Reform	To make something better by changing it.	<i>The school wanted to reform the lunch menu to give kids healthier food options.</i>
	Squalor	Living in dirty or poor conditions.	<i>The family lived in squalor because their house had no clean water or electricity.</i>
	Wretched	Feeling very sad, miserable, or in a bad condition.	<i>After walking for hours in the rain, they felt wretched and cold.</i>

English | C19th Non-Fiction | Topic Dictionary: Writer's techniques

Word	Definition	In a sentence
Direct Address	When you talk to someone directly by using their name or a word like "you."	<i>The writer made me feel like they were speaking directly to me by using direct address.</i>
Anecdote	A story about something that happened, usually from someone's own life.	<i>The teacher told an anecdote about her childhood to explain the lesson.</i>
Facts	Things that are true or can be proven.	<i>It's a fact that the Earth revolves around the Sun.</i>
Opinion	Something that someone thinks or feels, which might not be true for everyone.	<i>In my opinion, cats are better than dogs.</i>
Rhetorical Question	A question asked to make a point, not to get an answer.	<i>I did not need you to answer back – that was a rhetorical question!</i>
Emotive Language	Words used to make people feel strong emotions.	<i>The emotive language in the story made everyone feel about the lost puppy.</i>
Statistics	Numbers that show facts or information about something.	<i>The statistics showed that most students passed the test with good marks.</i>
Triplet	A list of three or a three-part sentence.	<i>A tricolon is a catchy way to end a persuasive speech.</i>

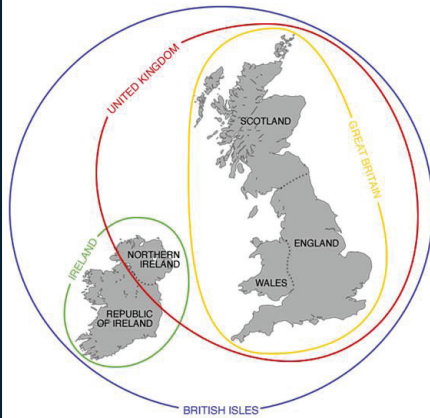
As a Year 8 English student I know:

The purpose of persuasive writing.	
The definitions various techniques writers use for effect, including DAFOREST techniques.	
Writers have different perspectives and convey these through their language.	
Like many societies, Victorian Britain was a hierarchy where the impoverished had little power.	
Nineteenth-century vocabulary and sentence structures differ from modern English.	

As a Year 8 English student I can:

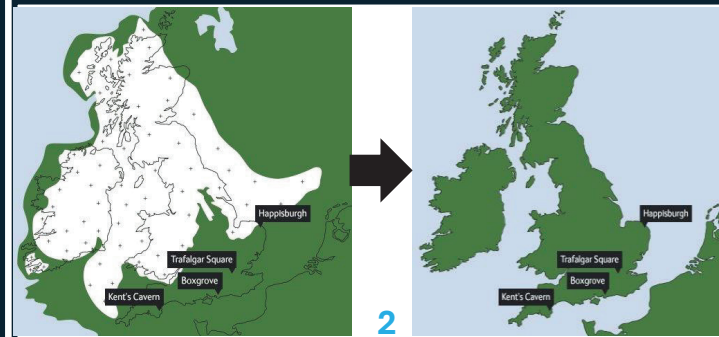
Identify a writer's purpose and match my writing to my own purpose effectively.	
Identify and use various techniques, including DAFOREST.	
Identify and analyse how writers use language to convey their perspective.	
Consider how hierarchies such as class affect us and explain my view on the topic.	
Use comprehension strategies to work out the meanings of complex or unfamiliar words and sentence structures.	

Geography | How is the UK changing? | Knowledge Organiser



Great Britain is the island we live on.
The United Kingdom is the country/ nation state we live in. This includes the nations England, Scotland, Wales and Northern Ireland.
The British Isles is a geographical term for all the islands found off northwestern Europe, including the Republic of Ireland which is a separate country.

1



From 20,000 years ago to now, the UK's coastline has been altered by the **retreating ice** and **rising sea levels**. The coast will never be static, and will continue to change in between ice ages.

As a Year 8 Geographer, I know...

1. What the UK is made up of
2. How the UK's physical geography has changed.
3. Who lives in the UK.
4. Where people in the UK live.
5. How the economic structure of the UK has changed.
6. Where our food and energy comes from.



6

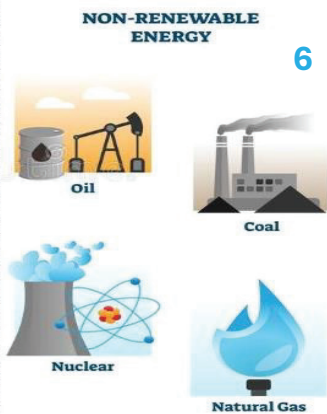
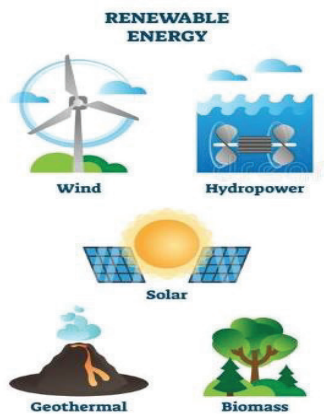
Food security is impacted by...

Population growth. As demand for food increases, so will the price



Since Brexit and the UK's exit from the EU, imports and exports are delayed, increasing prices.

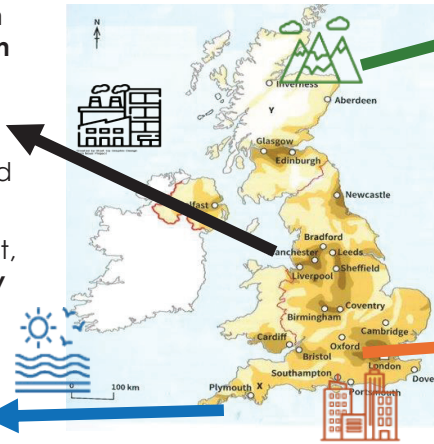
Climate change is impacting farmers environmentally and economically.



6

The **Industrial Revolution** led to rapid **urbanisation** in cities with lots of resources. Many cities such as Manchester still remain highly populated today.

In cities along the coast, the closer the **proximity to the coastline**, the larger the population. This is due to attractive environments and job opportunities.

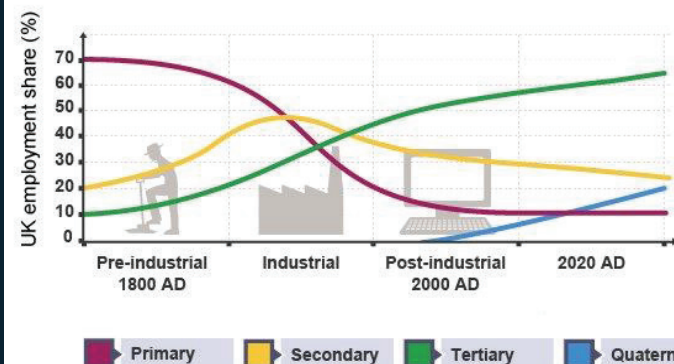


The **topography** of areas such as the Scottish Highlands leads to **low population densities**.

Areas with plenty **job opportunities and leisure** activities, such as London, lead to areas of **high population density**.

4

The Clark Fischer Model



The **employment structure** of the UK has changed overtime, with different types of jobs being popular across British history.

5

Geography | How is the UK changing? | Skills guide

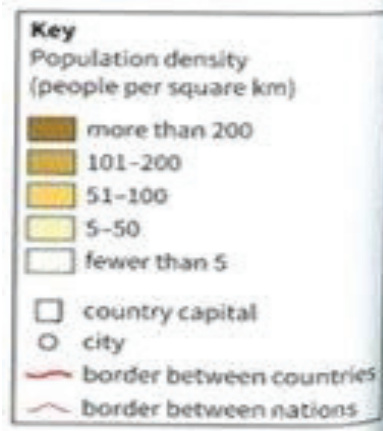
Explaining in Geography



- Consequently
- As a result of
- Therefore
- This means that

Expand our points in order to show our geographical ability to explain our points. **CATT statements** will help us do this.

4



Explain population distribution across the UK. (4 marks)

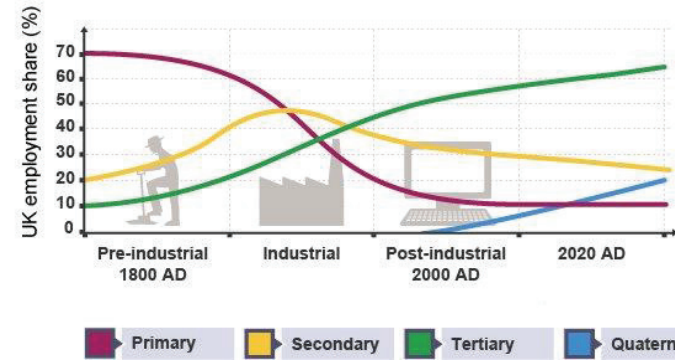
One reason for the a variation in population densities is that many people chose to live close to the sea in the UK **as a result of** the beautiful natural landscapes in locations such as Plymouth. Many of these areas are **therefore** densely populated. **Consequently** more job opportunities are available here as people open businesses for tourists. **This means that** the number of jobs in tourist industries increase, and there is an economic incentive to live there.



Describing in Geography

To structure your response in relation to **describing a trend** you should follow the steps here.

- Trends – give the overall pattern
- Examples – specific examples to prove your point.
- Anomalies – any countries that do not fit the pattern you expect to see.
















Describe the changes in primary employment overtime in the UK. (3 marks)

Before the industrial revolution, most jobs in the UK were in the primary sector, for example working as farmers. However, this rapidly decreased during the industrial revolution from 70% to 20% whilst jobs in the secondary sector (just as manufacturing) grew. However, despite an increase in the tertiary (services) and quaternary (tech) job sectors in the modern era, the number of people working in the primary sector has stopped decreasing and has plateaued at 10%. This is due the growing population and demand for food.

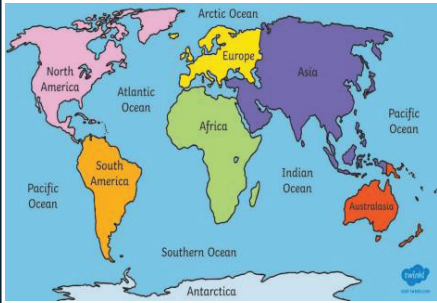
5

Geography | How is the UK changing? | Topic Dictionary

Image	Key word	Definition	In a sentence
	carbon neutral	When the same amount of CO2 is released into the atmosphere as is removed from the atmosphere.	The UK aims to be carbon neutral by 2050.
	densely populated	An area with a lot of people in it.	London is densely populated .
	food security	When people have access to enough safe and nutritious food for a healthy life.	Families who do not worry about having enough food are food secure . The UK has high levels of food security .
	food insecurity	When people do not have access to enough food for basic needs.	Families who struggle with food insecurity in the UK may use a food bank.
	fossil fuels	An energy source formed in the Earth's crust from decayed organic material. Examples are oil, coal and natural gas.	Burning fossil fuels emits a large amount of pollution and is therefore bad for the environment.
	immigration	Arriving to live permanently in a different country. An immigrant is a person who moves permanently to live in a different country.	The UK's immigration numbers have reduced since Brexit.
	nation	A group of people who share a common identity based on things like history, language, culture, ethnicity, or religion.	England, Scotland, Wales and Northern Ireland are the four nations that make up the UK.
	nation state	A country with political power over the nation.	The United Kingdom is a nation state .
	population density	The number of people in a certain area, this is usually in one square kilometre.	The population density of London is 5,596 people per square km.
	population distribution	The pattern of where people live.	The population distribution across the world is uneven.
	sparsely populated	An area with not a lot of people in it.	Areas in the countryside are sparsely populated .
	topography	The forms and features of Earth's surface.	The mountainous topography in Scotland results in low population density.
	urbanisation	The increase in the number of people living in towns and cities compared to the countryside.	Since the Industrial Revolution, urbanisation has seen the growth of many UK cities.

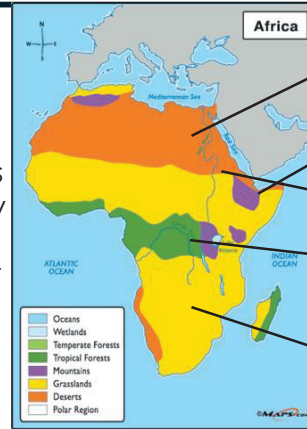
Geography | Is Africa a changing continent? | Knowledge Organiser

Africa is the second largest continent. It is located in the middle of the world map. **1**



Being so large, Africa contains a variety of different **biomes**.

3



- Hot desert
- Mountains
- Semi desert
- Rainforest
- Savanna grasslands

Africa is a young continent. With over 40% of its working age population between ages of 15 and 24, it's the youngest continent in the world. There are almost 200,000,000 youths in Africa. **4**



Having a youthful population has pros and cons

Pros	Cons
Increased number of educated citizens	Pressure on local resources and services
More people working, boosting economy	Loss of knowledge and tradition



Within Angola, lots of people are moving from the countryside into the city of Luanda. This is due to a variety of push and pull factors.

Rural area



- Poor healthcare in rural areas.
- Little access to drinking water
- Poor education
- Crop failure

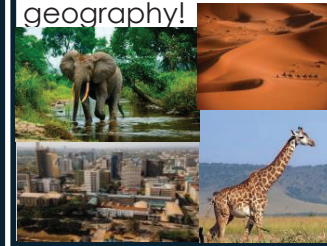
City of Luanda



- Better hygiene and sanitation.
- More jobs
- Better education
- Access to clean drinking water

5

Africa has a variety of impressive physical and human features, which makes it a great place to study in geography! **2**



As a Year 8 Geographer, I know...

1. Where Africa is located.	
2. The key physical and human features of Africa.	
3. The different biomes found in Africa, and their key features.	
4. That Africa's population is changing due to it being a young continent.	
5. Why Luanda is a growing city due to the push and pull factors.	
6. To be critical of whether the dream sold by pull factors are always a reality.	
6. The causes of poverty in Africa today.	
7. Examples of aid provided to Africa.	

6

War

Corrupt governments

Causes of poverty in Africa

Population increase

Poor healthcare

Climate

Poor education

An example of long-term aid being provided to Africa is the Send a Cow project. It has a unique 'pass it on' principle, creating a chain of giving and long-term difference. As a part of this project, a cow is provided to a family in need, who can then use the cow of dairy and manure for growing crops. This creates an income. **7**



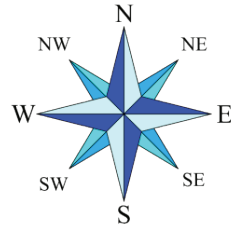
Send a Cow
Change a family's future

Seeds, building materials and stoves are also supplied.

Geography | Is Africa a changing continent? | Skills guide

How to use a compass.

The compass helps you geographically describe where places are on the map.



Angola is a country located in **west** Africa, **north** of Namibia and **west** of Zambia. The capital city of Angola is Luanda found in the **north west** of the country. The **western** side of Luanda is located on Angola's **northern** Atlantic coast.

5

Interpreting a graph

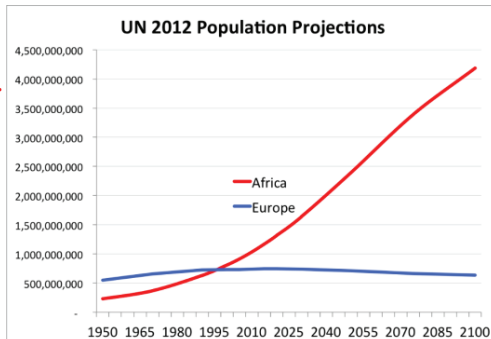
If you are asked to explain a pattern on a graph the following structure will help you.



4

1. **Trend** – what this the overall pattern of the graph.
2. **Examples** – pick out examples that support the overall pattern
3. **Anomalies** – is there any part of the data that doesn't fit the overall trend.

Africa's population has increased rapidly overtime. For example, in the last 40 years, the population of Africa has increased by approximately 500,000,000. However, since 1995, Europe's population has been slowly decreasing.



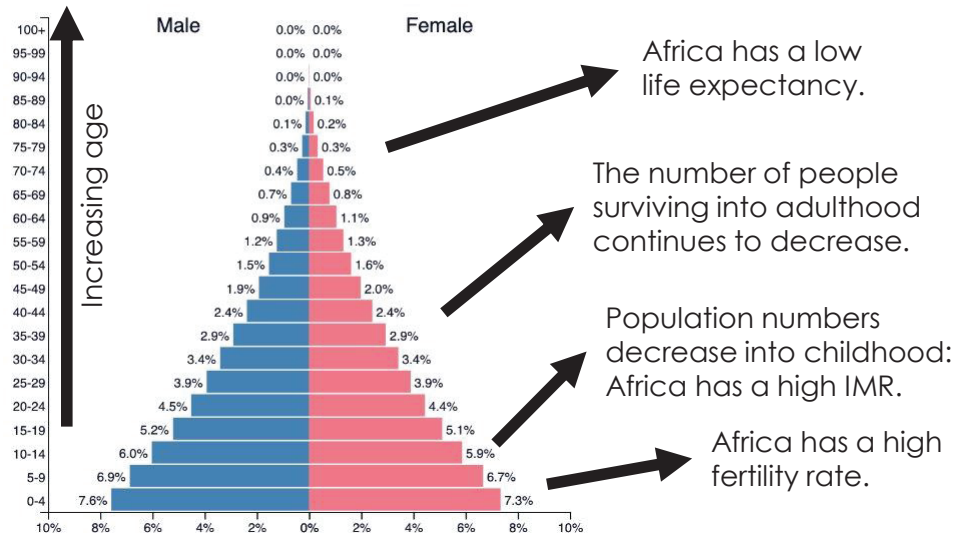
How to read a population pyramid.

4

A population pyramid shows the breakdown of a country's population by age and gender. Think of it like a snapshot of all the people living there, from babies to the elderly. It's like a two-sided story: **Left blue side = males**
Right pink side = females

AFRICA ▼ 2020













Population: 1,340,598,113









What the bars show us.

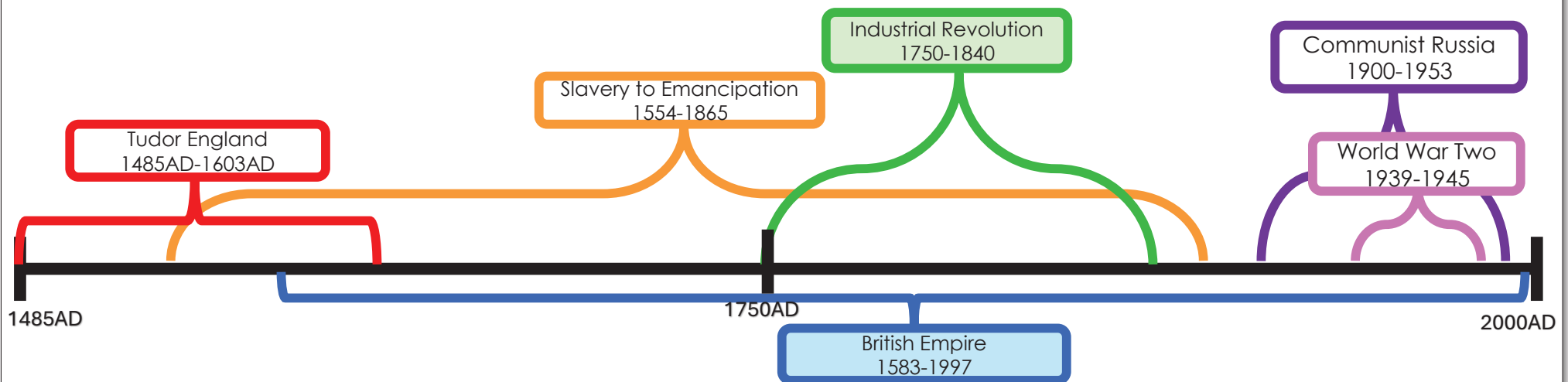
- The Bottom (Age 0-4):** This is where the youngest people are. A wider base means there are more young people in that country.
- The Top (Older Ages):** As you move up, you'll see bars representing older age groups. A narrow top suggests a low life expectancy.
- The Length of the Bars:** The length of each bar shows how many people are in that age group, usually as a percentage of the total population.

Geography | Is Africa a changing continent? | Topic Dictionary

Image	Key word	Definition	In a sentence
	aid	Help, typically of a practical nature or through the giving of money.	St Mark's donates food to food banks as a form of aid for people who cannot afford food.
	biome	A large naturally occurring community of plants and animals occupying a major habitat. A biome is a very large ecosystem.	One biome found in Africa is the tropical rainforest, which has a variety of species.
	corruption	Dishonest or illegal behaviour by people in positions of power.	Corruption in Africa's governments has resulted in poverty in some countries.
	fertility rate	The number of babies born per woman.	Taiwan has a low fertility rate of 1 child per woman, however Kenya has a high fertility rate of 6 children per woman.
	human feature	things that have been built by people.	Skyscrapers are examples of human features .
	Infant mortality rate (IMR)	The number of children that die before reaching the age of 1.	The UK has a low IMR : very few babies die before 1.
	life expectancy	The average age that people live to in a given country.	Global life expectancy is increasing as medicine, hygiene and wealth increase.
	physical feature	Physical features are natural. They would be here even if there were no people around.	A mountain is an example of a physical feature in nature.
	poverty	There are multiple definitions of poverty. The World Bank suggests it can be understood as living on less than \$1/day.	The levels of poverty are higher in Liverpool than in London.
	pull factors	Things which make people want to go to an area.	The promise of a better job, education and healthcare are all pull factors , pulling someone to choose to live somewhere else.
	push factors	Things which make people want to leave an area.	Bad attributes of an area such as drought, war and poor education are all push factors , pushing people to want to leave.
	Subsistence farming	Farming to produce enough food to survive rather than to sell and make a profit.	Families who grow their own food in vegetable patches are subsistence farming .

History | How 'great' was the British Empire? | Topic Dictionary

Image	Key Word	Definition	In a sentence...
	civilise	To improve the social and cultural development of a country	The British saw it as their mission to civilise the rest of the world
	colony	A place that is controlled by an empire.	America was one of many countries that was a colony of the British empire
	consequence	Something that happened because of something else	A consequence of the teacher coming to work is that the pupils get taught.
	empire	A group of places, ruled by a single power.	The British empire spanned a quarter of the globe
	imperialism	The strategy of extending a countries power and influence by taking over others/ building an empire.	The British followed a policy of imperialism from 1583.
	indigenous	People who originally lived in a place, rather than moved there.	The indigenous people of South Africa are called Zulus



History | How great was the British empire? | Knowledge Organiser

The British Empire began in the 1500s and ended in the 1900s. At its height in 1922, it ruled over 400 million people, ¼ of the world. The empire changed significantly over time, and historians are constantly changing their view on the British Empire. It is also a controversial topic that many people have very strong opinions about today...

What did the American revolution (1776) change

Prior to colonisation, indigenous peoples inhabited America, Europeans brought diseases, like smallpox, that wiped out 50 million First nations Americans. Britain established the Roanoke colony in 1585. In 1607, with the help of the native Powhatan people the Jamestown colony was set up. America signs the declaration of independence, proclaiming that it has left the empire. In 1783, Britain signed the treaty of Paris stating that the 13 colonies had become their own country. They did this because:

- Its people hated the tax Britain was forcing America to pay for war with France
- 1776 Thomas Paine's Commonsense argues why tax is unfair and America should be free
- Punishments for not paying the tax were harsh such as the 1770 Boston massacre
- This paved the way for more enslavement (4 million by 1860) and into America's wild west.



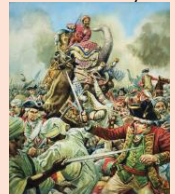
2

Ireland: "the laboratory for Imperial rule" because they were the first to experience it. Henry VIII started taking land from Gaelic tribes and giving it to English '**planters**'. Catholics were treated badly, prevented owning anything more than £5
1649: Oliver Cromwell waged war to establish control, murdering 400,000 Irish. **1800:** Ireland becomes part of the UK. **1845:** The harvest fails, and the potato famine leads to 1 million deaths and 1 million emigrating **1916:** A rebellion against English rule known as the Easter rising.



2

India: The Mughal empire was fading by the 1950s, powerful regional rulers, the nawabs were taking control. Bengal was the richest ruled by Siraj-ud-Daulah. **East India Company (EIC):** founded in 1600, it attempted to find new trade routes, they used armed forces to force locals to trade with them. The EIC's army was made up of **Sepoys**. Siraj-ud-Daulah set rules for the EIC, they had to pay taxes to him and could not expand their base at Fort William. The EIC ignored this leading to a rebellion in 1756 in Kolkata. The EIC led by Robert Clive defeated the Nawab at the **battle of Plassey** (pictured) and installed a new ruler. By 1764, the EIC defeated the Mughal emperor at Buxar leading to the Treaty of Allahabad Giving the EIC total control of Bengal.



2

The Caribbean: British plantation owners negotiated £20 million from the government in exchange for the slaves being freed in **1834**, their "lost property".

800,000 Freed people were made to work as 'apprentices' where they were still paid nothing. It was only after rebellions in 1838 that the apprenticeships system was abolished. However, white people still got the best jobs; freed people had no voting rights; their requests for more land was dismissed by Governor Edward Eyre in 1865; indentured servants, cheap labour from India and China, arrived from 1838 meaning fewer jobs for freed peoples.



2

After World War II, it was harder for Britain to justify having an empire as troops from colonies had made a huge difference. Britain's major ally, the USA, also hated imperialism.

Continuous resistance: before the organised Indian independence movement led by Gandhi in the 1920s, for example, was the Great Rebellion of 1857, where native troops (sepoys) revolted against British rule. Gradually, colonies claimed their independence. Most became members of the Commonwealth.

3

The "Scramble for Africa"

1. it was rich in raw materials such as diamonds, gold as well as rubber and palm oil (drivers of the industrial revolution).
2. Missionaries wanted to spread Christianity in the belief that this would "civilise" African people.
3. Plenty of land for new settler colonies
4. It became a competition between Britain, France, Germany and Belgium to see who could create the largest empire
5. Racism: White Europeans believed they were superior to African and that they had a right to rule Africa

The **Berlin conference 1884** would decide which European powers would control which parts of Africa. This led to wars with the African rulers such as the Zulus in southeast Africa, the kingdom of Benin and the Asante. Zulu king Cetshwayo →



2

Australia starts out as a convict settlement with the first prisoners arriving in 1788. The Aboriginal people and Torres Strait Islanders, who originally lived there, fought back for 140 years known as the **frontiers wars**. Some first peoples helped the British colonise as guides and labourers. In Queensland, many were recruited into the police force (pictured). By 1901 the states had settled together to create Australia.



As a Y8 Historian, I know...

1. Why the British empire is controversial.	
2. How empire was experienced in the colonies: America, Ireland, India, Australia, Africa and the Caribbean.	
3. Why the British empire ended.	

History Interpretations Skills Guide

How and why do historians' interpretations of empire differ?

An interpretation is anything written after an event happened. This could be a book published by a historian, a film, a painting, podcast, the list goes on. Two examples are below...

Interpretation A: BP Perry *Was the British empire a force for good?*

"Some, such as the West Indians of the 1940s and the Pakistanis, Indians and Bangladeshis of the 1970s were invited to work and settled in Britain, carving out distinctive communities for themselves...Thanks to the empire, Britain today is a multicultural melting-pot, forever changed by wave after wave of immigration... Not everyone is happy about immigration, and they'll tell you all about how unhappy they are over a plate of Chicken Tikka Masala!"

Interpretation B: Sathnam Sanghera, *Empireland: How imperialism has Shaped Modern Britain (2021)*

"It is childish to make imperial history to a matter of 'good' and 'bad'; trying to weigh up the positive and negative in this way is like defending yourself for kicking a random old man in the shins one afternoon by saying you helped an old lady across the road in the morning."

1) How do their views differ and how do you know this This requires us to look at the content and understand the tone and use quotes to show this

Interpretation A believes that without the British Empire, Britain would not have the amazing culture it has today. This is evident in the quote that "Britain today is a multicultural melting-pot".

Interpretation B on the other hand, believes that the positives don't make up for the negative impact on Britain. This is evident in the story it uses describing "kicking a random old man...(because) you helped an old lady cross the road" suggesting that good deeds cannot undo the bad ones










2) Why do their views differ? Here, we need to think about purpose

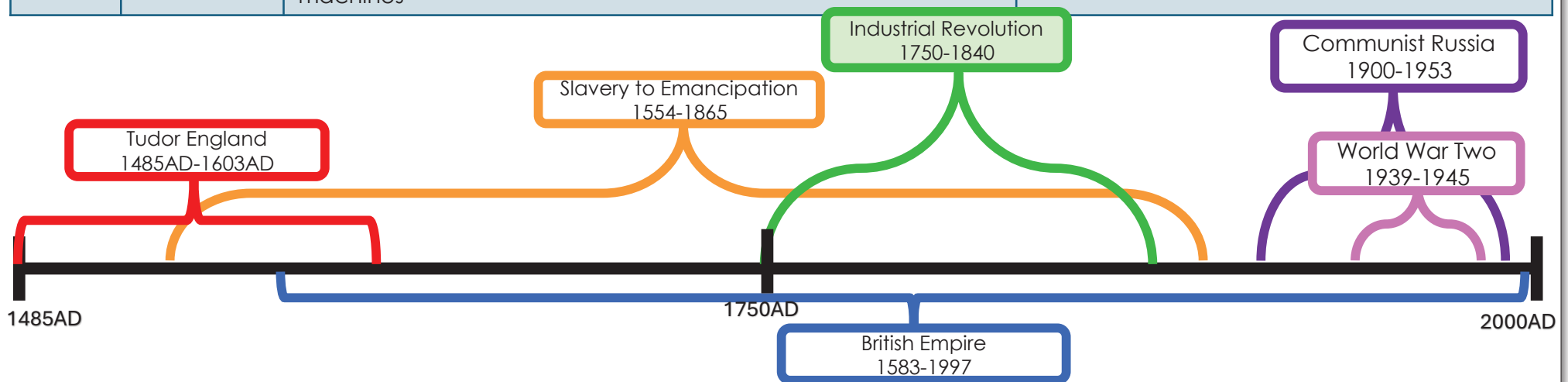
The two Interpretations differ because they are trying to achieve different aims. Interpretation A, is choosing to only examine the positives. Interpretation B, however, is trying to look at the effect of the empire in Britain today. These two interpretations have also used different sources to come to these conclusions.

3) Which one do YOU agree with more and why? There is not right or wrong answer here, it's all about how you back your points up with your own knowledge

E.g. I agree more with interpretation B. This is because, as Sanghera believes, no amount of good can make up for the instability created by the empire, which still lingers today. For example, civil wars in Africa today can be traced back to the way Africa was divided up between colonial powers at the 1884 Berlin conference.

History | How did the Industrial Revolution shape Britain? | Topic Dictionary

Image	Key Word	Definition	In a sentence
	black gold	(noun) coal; called "black gold" because of how valuable it was	Coal, also known as " black gold ", was used to power factory machines reliably.
	canal	(noun) a waterway made to transport goods	Boats on the canal transported coal.
	factory	(noun) a building where goods are made or assembled	People in the factory worked long shifts.
	industrial	(adjective) related to processing raw materials or making items	There were industrial changes throughout.
	locomotive	(noun) steam engines that move wheels along rails; trains	Richard Trevithick invented the first locomotive .
	pauper apprentice	(noun) orphans sent to work in factories for food and shelter	Pauper apprentices were not paid any money for their dangerous work.
	reform	(verb) to make changes to something in order to improve it	The working conditions needed reform .
	revolution	(noun) a dramatic and wide-ranging change	We have seen a digital revolution .
	steam engine	(noun) a new machine that used coal to boil water, and used the generated steam to turn a wheel, reliably powering machines	Steam engines were more reliable than waterwheels.



History | How did the Industrial Revolution shape Britain? | Knowledge Organiser



- Farmers **produced more food** by changing how we farm
- Hospitals provided **maternity beds** and **midwives**
- People started to get married **younger**, so had more time to have children
- **Cotton replaced wool**- it was easier to wash and therefore killed off more **germs**
- **Edward Jenner** discovered how to vaccinate against **smallpox** in **1796**
- After 1800, **cheap soap** was more available
- After the 1860s, councils began to **clean up water supplies** and **housing** for towns
- Some people had more children to **send them to work** and earn money
- The **1751 gin tax** made the alcohol harder to afford, so alcoholism decreased
- After **1870**, **schools improved literacy**, which meant people could read books about health, diet, cleaning, childcare and caring for the sick.
- After 1870, doctors started to use **antiseptics** and **anaesthetics**, which meant fewer patients died.

Before 1700, most items were produced at home. This was called the **domestic system**.

Then, machines were invented that sped up the process. The **Flying Shuttle** (1733) and the **Spinning Jenny** (1764) made cloth and thread more quickly, and could fit in a home. In **1769**, **Richard Arkwright** invented the **Spinning Frame**, a machine that could produce thread very quickly. It was too large to operate by hand, and had to be powered by a waterwheel, so **Arkwright built the first factory in 1771**. As the new factories were built, factory owners built houses for their workers to rent, and people set up shops, inns, churches, schools, and transport networks. **Places that had once been tiny villages became large towns- and towns became huge cities.**



Working conditions were dangerous in factories and mines.

Factories

- Dangerous **machinery** killed and maimed children
- **Dust** and **chemicals** were inhaled
- **Fines** for lateness and talking
- **Beatings** and whippings- some had nails hammered through their ears
- **12 hour shifts**, day or night
- Pauper apprentices paid **no money**

Mines

- Long **shifts** in **darkness**
- **Coal dust** was inhaled
- Children opened **trapdoors** and pushed **coal carts**
- Physically **exhausting**
- Risk of mine **collapse**, **flooding**, **explosion**
- **Low wages**- could owe boss

Alexander Graham Bell invented the **telephone** in **1876**, and worked all his life on making **electrical hearing aids** for deaf people- his wife was deaf.



Ada Lovelace invented the world's first **computer program** in the **1840s**, after she designed a way for Charles Babbage's "calculating machine" to be programmed with a code to calculate numbers.



As a Y8 Historian, I know...

1. why the population exploded after 1750.
2. how factories began, and how they shaped towns.
3. what conditions were like for workers in factories and mines.
4. why coal and iron were important to the Industrial Revolution.
5. how to describe some significant inventions.

4

Coal is a black rock that is burned as fuel. As the population increased, more machines were powered by steam engines, the demand for coal rose. Some made so much money from coal, they called it "Black Gold"!

4

Iron is a metal that has been used in Britain since the Roman times, but in the 1700s it was used to make cannons, ships, iron beams and machines, engines, tools, trains, rail tracks, stoves, and pans.

5

Inventions of the Industrial Revolution

James Watt designed a **steam engine** in **1781** that could turn a wheel, and therefore drive machinery. This changed how things are made forever.



Michael Faraday discovered how to **generate electricity** in 1831.



History | How did the Industrial Revolution shape Britain? | Causation Skills Guide

Historians use the term 'causes' – or reasons – to describe the **things that made events happen**. When historians try to work out **different causes** of historical events, they need to be able to **justify** why they think **one cause (or reason) is more important than another**.



“The population increase was the main cause of the growth of towns and cities.” How far do you agree?

1. Plan

Study the statement. Do you agree or disagree with it? What do you know about the topic? What other causes led to the event?

2. Judge

Decide which cause you think was **the most important one**. List the reasons for your choice.

3. Answer

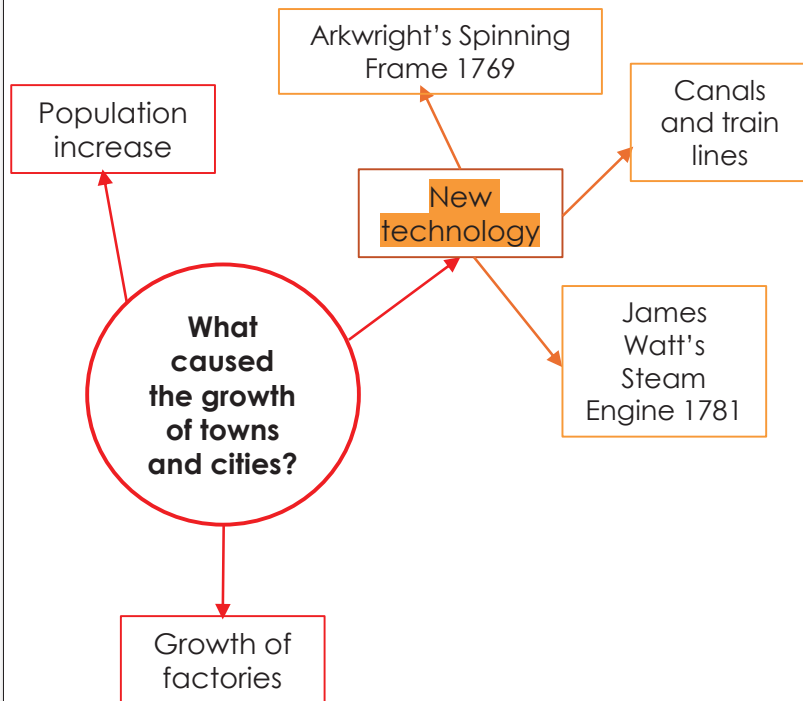
Make sure you **respond directly to the statement** – do you disagree, slightly agree, or strongly agree?

4. Explain

Add details to support your response and explain your view. Use your plan to help you add detail, and refer to the other causes. You might even be able to link them!

5. Conclude

Write a **concluding sentence**, stating your overall view clearly.



I disagree with the statement because I believe new technology was the **main cause of the growth of towns and cities**.

For example, Richard Arkwright invented the Spinning Frame in 1769, which could spin good quality thread quickly. This led to a change in industrial production, from the domestic system to the factory system. James Watt's Steam Engine in 1781 also led to the growth of towns and cities, because it meant the steam engine could power machinery more reliably than a waterwheel, and led to Britain becoming a world power through its ability to produce goods. Because these inventions offered employment, but had to be housed in factories, towns and cities grew. Canals and train lines were built to transport goods and people.

Some people might argue that the growth of factories was the main cause, and while I agree it led to more people moving to cities for work, these factories could not have developed without new technology. The population also increased in part because of these inventions; because children could earn money in factories and mines, families often deliberately had more. Growth of neither population nor factories would have happened without new technology.

Overall, I disagree with the statement, as new technology was the **main cause of the growth of towns and cities**, because it led to the factory system and enabled transport networks to develop.

IT | Webpages | Topic Dictionary

Keyword	Definition	In a sentence
	Defines bold text	Signifies text that should appear bold on the webpage.
Background-color	Defines the background color for an HTML element	CSS background-color property was used to change the background colour to a colour where the text can be easily read on.
<body>	Contains all the content of an HTML document	Anything to output on the web page must be inside the body tags.
CSS	Cascading style Sheets; used for the style and layout of the webpage.	We use CSS to set the size and font of a text, position text on the page, specify colour of text and other layouts.
<div>	Defines a division or section in a HTML document	The <div> tag is used as a container for HTML elements - which can then be styled using CSS.
Font-size	Specifies the size of the font	Font-size:12 , sets the size of the font to 12
Font-style	The font-style property specifies the font style for a text	Font-style: italic , emphasizes text by changing the text to italic format
Font-weight	Specifies how thick or thin characters in text should be displayed.	Font-weight:bold , changes the text to be thicker so it is bold on the webpage.
<h1> to <h6>	Defines HTML headings	<Header> tags are a container for introductory content or a set of navigational links.
HTML	Hypertext Markup Language; The building blocks of a webpage	HTML instructs the web browser on how information should be displayed on the webpage.
<html>	Shows it is an HTML document	The <html> tag is the container for all other HTML elements.
HTML tags	Defines how your web browser must format and display your web page	Tags are always enclosed in angle brackets: < >.

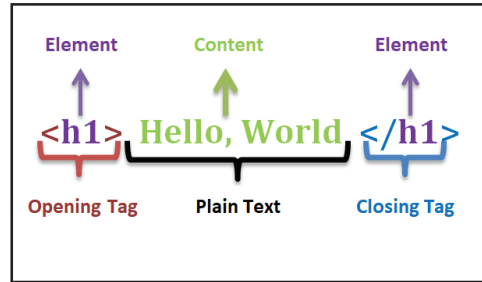
IT | Webpages | Topic Dictionary

Keyword	Definition	In a sentence
	Inserts an image into a webpage	An element must have two attributes: src, which fetches the image from the specified source, and alt, which provides alternative text for the image if it is not displayed.
<p>	Defines a paragraph	The <p> HTML tag separates text into blocks content in blocks represents blocks of text separated from adjacent blocks by blank lines.
<table>	Represents data in a table	The <table> tag represents information presented in a table consisting of rows and columns of cells containing data
<text>	Defines centre text	The <center> tag is used to format text to the center of the line, horizontally.
Text-align	Sets the horizontal alignment of a text.	A text-align can be left or right, centered, or justified.
<title>	Defines the title for the document	The <title> tag defines the document's title that is shown in a browser's title bar or a page's tab.
<!--...-->	Defines a comment	Comments are not displayed in the browsers, but it helps users to understand what the code is doing.
<u>	Defines underline text	The <u> tag is used to underline text to make it more distinct to the other text..

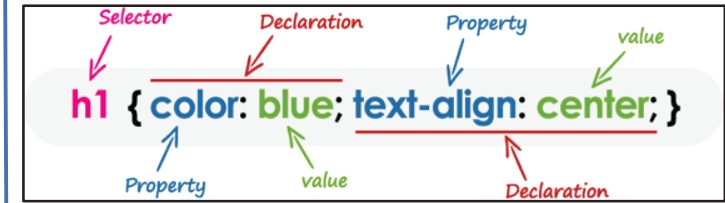
IT | Webpages | Knowledge Organiser

CSS uses `{ }`
 HTML uses `< >`

HTML



CSS



Images in HTML

```

```

This is the image.

This changes the size of the image.

HTML Code

```
<!doctype html>
<html>
<head>
  <link rel="stylesheet" href="style.css">
</head>
<body>
  <h1>My Culture</h1>
  <p> This is a web page about my culture, created using HTML and CSS.</p>
  <div>
    
  </div>
  <p> This is where it is located on a map.</p>
</body>
</html>
```

CSS Code

```
body {
  background-color: lightcyan;
}
h1 {
  color: steelblue;
  text-align: center;
}
p {
  color: slateblue;
  text-align: center;
  font-size: 20px;
  font-weight: bold;
  font-style: italic;
}
div {
  text-align: center;
}
```

HTML Layout

```
<!DOCTYPE html> ← HTML5 declaration
<html lang="en"> ← HTML start tag
<head> ← Head start tag
  <title>Webpage Title</title>
  <meta charset="UTF-8">
  <meta name="description" content="Free web tutorial">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <link rel="stylesheet" href="styles.css">
  <script src="script.js"></script>
  <base href="https://www.scientecheasy.com/" target="_blank">
</head> ← Head end tag
<body> ← Body tags
</body>
</html> ← HTML end tag
```

HTML elements in <head> and </head> tags

Body tags

Scientecheasy

My Culture Webpage

This is a web page about my culture, created using HTML and CSS.



This is where it is located on a map.

Stewardship: What is Environmental Activism?

Year 8
Spring 1

Big Idea: Community
How do we all live together?



What is Stewardship?

Key learning points

- Stewardship is the responsibility to look after something
- Good stewards are kind, calm, thoughtful and good leaders
- Christians have a duty of stewardship
- We are all stewards to look after the planet

stewardship



What is Activism?

Key learning points

- Activism is trying to make change in the world for what you believe in
- It involves protest, petitions, voting, letter writing and joining activist organisations
- Different activist groups are sometimes opposed to each other

activist



How can I be an Activist?

Key learning points

- Being informed is key to being an activist because it means you know what you're talking about
- Greta Thunberg is an excellent example of a famous young activist who has changed the world, even at her age

informed



What Activist Groups could I Join?

Key learning points

- Four activist groups often joined by young people are Amnesty International, Black Lives Matter, the RSPCA and Young Minds.
- Joining an activist group is free and often a great way for even young people to get involved in democracy

protest



Does Activism Work?

Key learning points

- Activism actually fails more often than it succeeds, but that's no reason not to try
- Many activist groups use confrontation, a heated and sometimes physical disagreement, to get attention and to make their point, although it's often controversial

confrontation



What is Environmental Activism?





Key learning points

- Environmental activism is taking part in activism in order to protect the environment, and is an example of stewardship
- It can be done alone or as part of an activist group, and each one has its own methods of making change

advocate



Lifeology | Stewardship: What is Environmental Activism? | Topic Dictionary

<u>Image</u>	<u>Word*</u>	<u>Definition</u>	<u>In a sentence . . .</u>
	stewardship	The responsibility of looking after something.	Now we're in Year 8, we have a duty of stewardship to the Year 7s who look to us for guidance and help sometimes.
	activist	Someone who tries to make a change in the world.	Some people use their celebrity or their wealth to help them be an activist .
	informed	Knowing what's going on in the world around you.	Education makes sure you're informed about your rights, history and community.
	protest	When people get together to show they have a problem with something.	Leading and organising a protest is often a good way to get noticed by powerful people.
	confrontation	An angry and sometimes physical disagreement between people or groups.	The key to working out your problems with people is to be polite and avoid confrontation to keep them calm.
	advocate	To fight for someone else's rights.	Activists often advocate for all of us in society when they demand change.

Key Lifeology words are in **bold*

Skills Guide: Lifeology Assessments

This is your chance to show off **as much of your knowledge as possible** from the **last five lessons**.

1. When the teacher instructs you, use **10 minutes** to **fill in the planning worksheet**. This is your chance to **look back through your book** and gather all the right answers. The sheet is for you to refer to during your assessment, so you don't need to use full sentences. The work only has to make sense to you! Look back at your **last assessment** and check the feedback here!
1. Complete the **assessment**. You will have **15 minutes** to produce a **piece of writing** to answer the question you've been studying for the last five weeks. Write like you're in an English lesson - **full sentences, proper spelling and grammar**, and **paragraphs**. Make sure to mention **as much as you can** from your **planning sheet**. The order you mention it in doesn't matter, **so long as it's all there**.
1. Use a **green pen** to **self-assess** your work. Compare the **assessment** you just did with the **success criteria** on the **feedback sheet**. Remember to **tick your work** wherever you're awarding a mark!

As a Year 8 Lifeology Student, I know...

By the end of Spring 1

1. Whether Christian or not, we all have a duty of stewardship, which means looking after the people and things around us.
2. Activism involves trying to change the world for the better and there are lots of easy ways to do it, like signing a petition.
3. Good activists, like Greta Thunberg, are informed and know what's going on in the world around them.
4. There are many activist groups that young people can join, including BLM, the RSPCA and Young Minds.
5. Activism doesn't always work, so sometimes activist groups use confrontation to get noticed and be listened to.
6. Environmental activism is extremely important and young people can do it too, often without too much effort.

Respectful Relationships: How do I have Good Friendships?

Year 8
Spring 2

Big Idea: Care
How do I keep myself safe?



What's a Healthy Friendship?

When is Conflict actually Bullying?

What are Boundaries?

What's a Healthy Romantic Relationship?

What is Conflict Resolution?

How do I have Good Friendships?

Key learning points

- Healthy friendships are respectful, where you treat people with kindness
- Toxic friendships negatively impact mental health
- If you have a toxic friend you need to communicate with them

Key learning points

- Conflict is a disagreement and bullying is an imbalance of power
- Strategies to respond to bullying include, talking to friends and family, teachers in school

Key learning points

- Boundaries are clear and fair rules about what you will not do or accept
- Boundaries are normal for everyone to have and you can choose your own and do not owe anyone an explanation

Key learning points

- Healthy romantic relationship are reciprocal and respectful
- Reciprocal refers to something that is the same on both sides

Key learning points

- A method of resolving conflict is compromise which means to give up some of what you want to consider someone else's wishes
- This can help you understand different perspectives and decide what you will not give up

Key learning points

- Good relationships are respectful, and have clear boundaries. If you have a toxic relationship it is best to communicate with them or seek support from others

respectful



imbalance



boundaries



reciprocal









compromise



mutual



Lifeology | Respectful Relationships: How do I Have Good Friendships? | Topic Dictionary

<u>Image</u>	<u>Word*</u>	<u>Definition</u>	<u>In a sentence . . .</u>
	respectful	Treating someone with kindness, friendliness and honesty.	I thought it was very respectful when he wished me good morning every day.
	imbalance	When two things are not balanced with each other.	There is an imbalance of power between a teacher and the principal - the principal has more!
	boundaries	Clear and fair rules about what you will not do or accept.	Being open about your boundaries is key to having a successful relationship with someone.
	reciprocal	Something that is the same on both sides.	Going into a shop and buying something is reciprocal - you give them the money, they give you the thing.
	compromise	Give up some of what you want when you consider someone else's wishes.	If you plan a date, you will need to compromise on your interests.
	mutual	A shared feeling and/or behaviour between people.	Friendships are often based on mutual interest that you both enjoy doing.

Key Lifeology words are in **bold*

Skills Guide: Lifeology Assessments

This is your chance to show off **as much of your knowledge as possible** from the **last five lessons**.

1. When the teacher instructs you, use **10 minutes** to **fill in the planning worksheet**. This is your chance to **look back through your book** and gather all the right answers. The sheet is for you to refer to during your assessment, so you don't need to use full sentences. The work only has to make sense to you! Look back at your **last assessment** and check the feedback here!
1. Complete the **assessment**. You will have **15 minutes** to produce a **piece of writing** to answer the question you've been studying for the last five weeks. Write like you're in an English lesson - **full sentences, proper spelling and grammar**, and **paragraphs**. Make sure to mention **as much as you can** from your **planning sheet**. The order you mention it in doesn't matter, **so long as it's all there**.
1. Use a **green pen** to **self-assess** your work. Compare the **assessment** you just did with the **success criteria** on the **feedback sheet**. Remember to **tick your work** wherever you're awarding a mark!

As a Year 8 Lifeology Student, I know...

By the end of Spring 2

1. Healthy friendships are based on kindness and communication, which we need to practice when friendships become toxic.
2. When conflicts become bullying, we have strategies to deal with it, like talking to friends, family, and teachers in school.
3. We can choose our own boundaries about what we find acceptable, and we don't owe anyone an explanation.
4. Healthy romantic relationships are respectful and reciprocal - they involve feelings which go both ways.
5. To resolve conflicts, it's important to understand the other person's perspective and whether a compromise is possible.
6. Healthy relationships are respectful and have clear boundaries. Communication is key to avoiding toxic relationships.

Y8 Spring Term: Block 1 – Brackets, Equations and Inequalities

Previous Block:

Tables and Probability

I can understand inequality notation.

Simple Inequalities

< less than ≤ Less than or equal to
 > More than ≥ More than or equal to

I can form and solve inequalities.

Form and solve inequalities

Two more than treble my number is greater than 11
 Find the possible range of values

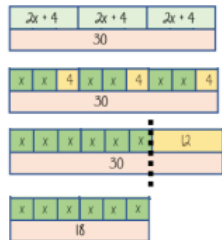
Form $x \rightarrow x3 \rightarrow +2 \rightarrow ||$
 $3x + 2 > 11$

Solve $x \leftarrow -3 \leftarrow -2 \leftarrow ||$
 $x > 3$

Next Block:
Sequences

I can solve equations using brackets.

Solve equations with brackets



$3(2x + 4) = 30$
 Expand the brackets
 $6x + 12 = 30$
 $-12 \quad -12$
 $6x = 18$
 $-6 \quad -6$
 $x = 3$

Substitute to check your answer. This could be negative or a fraction or decimal.

$4(x - 5) = 18$
 $4x - 20 = 18$
 $4x = 38$
 $x = \frac{38}{4}$
 $x = 9.5$

$5x - 6 = 3(x - 1)$
 $5x - 6 = 3x - 3$
 $2x - 6 = -3$
 $2x = 3$
 $x = 1.5$

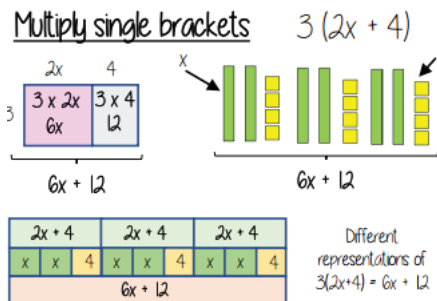
$3(m - 4) = 21$
 $3m - 12 = 21$
 $3m = 33$
 $m = \frac{33}{3}$

I can use directed numbers with the 4 operations.

Directed numbers

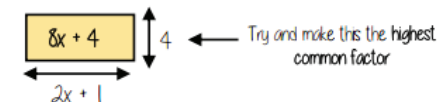
$++ \rightarrow +$ e.g. $a = -5$ and $b = -2$
 $- - \rightarrow +$ $a^2 = a \times a = -5 \times -5 = 25$
 $+ - \rightarrow -$ $b + a = -2 + -5 = -7$
 $- + \rightarrow -$

I can multiply out a single bracket.



I can factorise into a single bracket.

Factorise into a single bracket $8x + 4$



The two values multiply together (also the area) of the rectangle

$8x + 4 \equiv 4(2x + 1)$

Note:
 $8x + 4 \equiv 2(4x + 2)$
 This is factorised but the HCF has not been used

Maths | Brackets, Equations and Inequalities | Topic Dictionary

Key Word	Definition	In a sentence
coefficient	A number that multiplies a variable in an algebraic expression.	In the term $3x$, 3 is the coefficient .
equation	A mathematical statement that shows two expressions are equal, often with an "equals" sign.	The equation $5+x=12$ can be solved to find the value of x .
equivalent	Expressions or values that are the same, even if they look different.	$2+3 = 5$ are equivalent because they have the same value.
expression	A combination of numbers, variables, and operations, but without an equals sign.	$4x+3$ is an expression because it has terms and coefficients but no equals sign.
factorise	To rewrite an expression as a product of factors.	To factorise $6x+9$, we rewrite it as $3(2x+3)$.
HCF	The largest factor that two or more numbers have in common.	The HCF of 12 and 18 is 6 because it's the largest number that divides both evenly.
LCM	The smallest multiple that two or more numbers share.	The LCM of 4 and 5 is the smallest number both can divide into.
simplify	To make an expression easier by combining like terms or reducing fractions.	To simplify $3x+2x$, you combine terms to get $5x$.
substitute	To replace a variable with a number to calculate the value of an expression.	If $x=3$, substitute 3 for x in $2x+4$ to get $2(3)+4=10$.
terms	Parts of an expression separated by + or - signs.	In $4x+5$, $4x$ and 5 are the terms .

Maths | Brackets, Equations and Inequalities | Skills Guide

Solve the inequality.

$$21 \leq 2x + 3$$

$$\begin{array}{r} -3 \quad -3 \\ \hline \end{array}$$

$$18 \leq 2x$$

$$\begin{array}{r} \div 2 \quad \div 2 \\ \hline \end{array}$$

$$9 \leq x$$

$$x \geq 9$$

Find an expression for the area of this rectangle, giving your answer in the form $ax^2 + bx + c$.

$$(x + 5) \text{ cm}$$



$$(x - 2) \text{ cm}$$

Area
or
Rectangle = B x H

$$(x + 5)(x - 2)$$

$$x^2 - 2x + 5x - 10$$

$$x^2 + 3x - 10$$

Y8 Spring Term: Block 2 – Sequences

Previous Block:
Brackets,
Equations and
Inequalities

Next Block:
Indices

I can understand complex algebraic rules.

Misconceptions and comparisons

$2n^2$

2 times whatever n squared is

e.g.
1st term = $2 \times 1^2 = 2$
2nd term = $2 \times 2^2 = 8$
100th term = $2 \times 100^2 = 2000$

$(2n)^2$

2 times n then square the answer

e.g.
1st term = $(2 \times 1)^2 = 4$
2nd term = $(2 \times 2)^2 = 16$
100th term = $(2 \times 100)^2 = 40000$

$n(n+5)$

e.g.
1st term = $1(1+5) = 6$
2nd term = $2(2+5) = 14$
100th term = $100(100+5) = 10500$

You don't need to expand the expression

I can find the nth term rule.

H Finding the algebraic rule

This is the 4 times table → $4, 8, 12, 16, 20, \dots$

$4n$

↓ ↓ ↓

$7, 11, 15, 19, 22$

← This has the same constant difference – but is 3 more than the original sequence

$4n + 3$

$4n + 3$

This is the constant difference between the terms in the sequence

This is the comparison (difference) between the original and new sequence

I can understand the difference between linear and non-linear sequences.

Linear Sequences – increase by addition or subtraction and the same amount each time


Non-linear Sequences – do not increase by a constant amount – quadratic, geometric and Fibonacci

- Do not plot as straight lines when modelled graphically
- The differences between terms can be found by addition, subtraction, multiplication or division

Fibonacci Sequence – look out for this type of sequence

0 | 1 | 1 | 2 | 3 | 5 | 8 | ...

Each term is the sum of the previous two terms



I can create sequences from algebraic rules.

Sequences from algebraic rules This is substitution!

$3n + 7$ → This will be linear - note the single power of n. The values increase at a constant rate

$3n^2 + 7$ → This is not linear as there is a power for n

$2n - 5$ → Substitute the number of the term you are looking for in place of 'n'

e.g.
1st term = $2(1) - 5 = -3$
2nd term = $2(2) - 5 = -1$
100th term = $2(100) - 5 = 195$

Checking for a term in a sequence Form an equation

Is 201 in the sequence $3n - 4$? Term to check

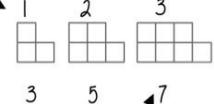
Algebraic rule → $3n - 4 = 201$

Solving this will find the position of the term in the sequence. ONLY an integer solution can be in the sequence.

I can understand sequences both in a table and graphically.

Position: the place in the sequence

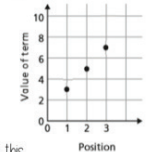
1 2 3



3 5 7

Term: the number or variable (the number of squares in each image)

Graphically



"The term in position 3 has 7 squares"

In a table

Position	1	2	3
Term	3	5	7

Because the terms increase by the same addition each time this is **linear** – as seen in the graph

Maths | Sequences | Topic Dictionary

Key Word	Definition	In a sentence
constant	A fixed value that does not change.	In the expression $3x+7$, the number 7 is a constant because it doesn't change.
fibonacci	A sequence where each number is the sum of the two previous numbers.	The fibonacci sequence appears in nature, like in the arrangement of leaves and the spiral of shells.
geometric	A type of sequence where each term is found by multiplying the previous term by a constant.	In the geometric sequence 2, 4, 8, 16, each term is multiplied by 2.
linear	A sequence where each term increases or decreases by the same amount, forming a straight line when graphed.	The sequence 3, 5, 7, 9 is linear because it increases by 2 each time.
rule	A guideline or formula for finding terms in a sequence.	The rule for the sequence 2, 4, 6, 8 is "add 2" each time
sequence	An ordered list of numbers that follow a certain pattern or rule.	5, 10, 15, 20 is a sequence because each term follows the rule of adding 5.
substitute	To replace a variable with a number to calculate the value of an expression.	The question asked me to substitute into the expression $n=3$.
term-to-term	A method of finding the next term in a sequence by using the previous term and a specific rule.	In a term-to-term rule like "add 3," each term is found by adding 3 to the previous one.

Maths | Sequences | Skills Guide

A sequence is given by the rule $4n - 5$

What is the 10th term in the sequence?

$$4(10) - 5 = \underline{35}$$

What is the 20th term in the sequence?

$$4(20) - 5 = \underline{75}$$

Find rules for the n th term of each sequence.

6, 11, 16, 21, ...

$$\begin{array}{cccc}
 1 & 6 & 11 & 16 & 21 \\
 & \underbrace{\quad} & \underbrace{\quad} & \underbrace{\quad} & \\
 -5 & +5 & +5 & +5 & \\
 & \searrow & \searrow & \searrow & \\
 & & & & 5n + 1
 \end{array}$$

Write the first three terms of the sequence $n^2 + 3$

$$\begin{array}{l}
 n=1 \\
 (1)^2 + 3 = \underline{4} \\
 n=2 \\
 (2)^2 + 3 = \underline{7}
 \end{array}
 \quad \Bigg| \quad
 \begin{array}{l}
 n=3 \\
 (3)^2 + 3 = \underline{12}
 \end{array}$$

Work out the missing terms in each sequence.

A 16, 12, 8, 4, 0, ... (-4 each)

B 5, 10, 20, 40, 80, ... (x2 each time)

Y8 Spring Term: Block 3 – Indices

Previous Block:
Sequences

Next Block:
Fractions and Percentages

I can divide expressions with indices.

Divide expressions with indices

$$\frac{24}{36} \rightarrow \frac{\cancel{2} \times \cancel{2} \times 2 \times \cancel{3}}{\cancel{2} \times \cancel{3} \times 2 \times \cancel{3}} \rightarrow \frac{2}{3}$$

$$\frac{5a^3b^2}{15ab^6} \rightarrow \frac{\cancel{5} \times \cancel{a} \times a \times a \times \cancel{b} \times \cancel{b}}{3 \times \cancel{5} \times \cancel{a} \times \cancel{b} \times \cancel{b} \times b \times b \times b} \rightarrow \frac{a^2}{3b^4}$$

Cross cancelling factors shows cancels the expression

$$\left. \begin{array}{l} 23a^7y^2 \\ 5db^6 \end{array} \right\} \text{This expression cannot be divided (cancelled down) because there are no common factors or similar terms}$$


I can multiply expressions with indices.

Multiply expressions with indices

$$\begin{array}{l} 4b \times 3a \\ \equiv 4 \times b \times 3 \times a \\ \equiv 4 \times 3 \times b \times a \\ \equiv 12ab \end{array} \quad \begin{array}{l} 5t \times 9t \\ \equiv 5 \times t \times 9 \times t \\ \equiv 5 \times 9 \times t \times t \\ \equiv 45t^2 \end{array} \quad \begin{array}{l} 2b^4 \times 3b^2 \\ \equiv 2 \times b \times b \times b \times b \times 3 \times b \times b \\ \equiv 2 \times 3 \times b \times b \times b \times b \times b \\ \equiv 6b^6 \end{array} \left. \vphantom{\begin{array}{l} 4b \times 3a \\ 5t \times 9t \\ 2b^4 \times 3b^2 \end{array}} \right\} \text{There are often misconceptions with this calculation but break down the powers}$$

I can use terms such as co-efficient, power, term and expression.

Coefficient: $5x^2 + 4x^4$
 Term: $5x^2$ $4x^4$
 Power: 2 4
 Expression: $5x^2 + 4x^4$



Each square represents x^2 and each cube represents x^4

Only similar terms can be simplified
If they have different powers, they are unlike terms

I can use the addition law when working with indices.

$$3^5 \times 3^2 \rightarrow 3^7$$

$$= (3 \times 3 \times 3 \times 3 \times 3) \times (3 \times 3)$$

The base number is all the same so the terms can be simplified

Addition law for indices
 $a^m \times a^n = a^{m+n}$

I can use the subtraction law when working with indices.

$$3^5 \div 3^2 \rightarrow 3^3$$

$$\frac{3 \times 3 \times 3 \times \cancel{3} \times \cancel{3}}{\cancel{3} \times \cancel{3}} \rightarrow \frac{3^3}{3^0} \rightarrow \frac{3^3}{1}$$

Subtraction law for indices
 $a^m \div a^n = a^{m-n}$

Maths | Indices | Topic Dictionary

Key Word	Definition	In a sentence
base	In a power, the base is the number that is multiplied by itself.	In 3 to the power of 4, 3 is the base because it's the number being multiplied.
denominator	The bottom part of a fraction, showing how many equal parts the whole is divided into.	In the fraction $\frac{3}{5}$, 5 is the denominator , meaning the whole is divided into 5 parts.
exponent	The small raised number in a power that shows how many times the base is multiplied by itself.	In 2 to the power of 5, 5 is the exponent , which means 222 is multiplied by itself 5 times.
expand	To multiply out parts of an expression, removing brackets.	When you expand $2(x+3)$, you get $2x+6$.
factor	A number that divides exactly into another number without leaving a remainder.	Factors of 12 include 1, 2, 3, 4, 6, and 12.
indices	Another word for exponents, indicating how many times a base is multiplied by itself.	In 5 to the power of 3, is an index , showing that 5 is used three times in multiplication.
numerator	The top part of a fraction, showing the number of parts being considered.	In the fraction $\frac{3}{5}$, 3 is the numerator , representing the parts we have out of 5.
powers	A way of expressing repeated multiplication of the same number. Written with a base and an exponent.	4 to the power of 2 means 4×4 .
product	The result of multiplying two or more numbers together.	The product of 6 and 4 is 24.
simplify	To reduce an expression to its simplest form by combining like terms or reducing fractions.	To simplify $\frac{4}{8}$, we can reduce it to $\frac{1}{2}$.

Show that $(2y^3)^3 \equiv 8y^9$

$$\begin{aligned}
 (2y^3)^3 &= 2y^3 \times 2y^3 \times 2y^3 \\
 &= 2 \times 2 \times 2 \times y^3 \times y^3 \times y^3 \\
 &= 8y^9
 \end{aligned}$$

Simplify the expressions.

$$3x^2 + 5x^2 \equiv \underline{8x^2}$$

$$7y^3 - 2y^3 + 6y^3 \equiv \underline{11y^3}$$

$$2d^2 + 7d^3 - 4d^3 + 2d^2 \equiv \underline{4d^2 + 3d^3}$$

Like terms

✓ Same power

✓ Same variable


Y8 Spring Term: Block 4 – Fractions and Percentages

Previous Block: Indices

Next Block: Standard Index form

I can express percentages using a calculator.

Express as a % - Calculator

Rosie 

$\frac{13}{30} \rightarrow \frac{13}{30} \rightarrow \times 100 \rightarrow 43.3333...%$


Don't use equivalence easily to find 'per hundred'


This is the same as $\frac{13}{30}$

Decimal percentages are still a percentage.

I can express percentages.

Express as a % - Non-calculator Percent – per hundred

 7 per every 10 are orange. $\frac{7}{10}$ This means that 70 per every 100 are orange. $\frac{70}{100} = 70%$

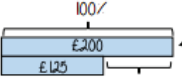
 27 per every 50 shaded. $\frac{27}{50}$ 54 per every 100 shaded. $\frac{54}{100} = 54%$

Denominator 100 Equivalent fractions

I can calculate percentage change.

Percentage change

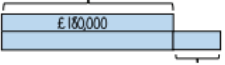
I bought a phone for £200. A year later sold it for £125.

 All values of change compare to the ORIGINAL value.

Percentage loss $\frac{75}{200} \times 100 = 37.5%$

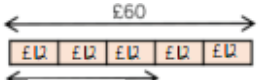
Difference in value $\times 100$ Original value

I bought a house for £180,000, I later sold it for £216,000.

 Percentage profit $\frac{36000}{180000} \times 100 = 20%$

I can find fractions of amounts.

Find $\frac{3}{5}$ of £60

 £60

£36

Remember $\frac{3}{5} = 60%$

10% of £60 = £6
 50% of £60 = £30
 60% of £60 = £36

I can convert between decimals, fractions and percentages.

$\frac{70}{100} \rightarrow$ This also means $70 - 100$ \rightarrow 70 out of 100 squares \rightarrow 70 hundredths $\rightarrow 70\%$

$\frac{70}{100} = 70 \text{ "hundredths"} = 7 \text{ "tenths"} = 0.7$

Using a calculator \rightarrow $\frac{70}{100} = 0.7$

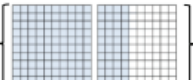
Be careful of recurring decimals
 e.g. $\frac{1}{3} = 0.3333333$
 $\frac{3}{10} = 0.\dot{3}$
 The dot above the 3

Convert to a decimal \rightarrow $\times 100$ converts to a percentage

This will give you the answer in the simplest form

I can convert between decimals, fractions and percentages which are bigger than 100%.

Convert FDP < and > 100%

100 hundredths 10 tenths 100%  40 hundredths 4 tenths 40%

140 hundredths 14 tenths 140%

$100\% + 40\% = 1 + 0.40 = 140$

Maths | Fractions and Percentages | Topic Dictionary

Key Word	Definition	In a sentence
conversion	The process of changing a number from one form to another, like from a fraction to a decimal.	The conversion of $1/4$ to a decimal is 0.25.
decimal	A number that includes a decimal point, showing values smaller than one.	The fraction $1/2$ is equivalent to the decimal 0.5.
equivalent	Having the same value, even if it looks different.	$1/2$, 0.5 and 50% are all equivalent .
estimating	Finding an answer that is close to the exact amount, usually by rounding numbers.	When estimating $47 + 32$, you might round to $50 + 30$ to get an answer of 80.
fraction	A way to show parts of a whole, written with a numerator and a denominator.	In the fraction $3/4$, 3 is the numerator and 4 is the denominator.
interest	The amount of money earned or paid for borrowing or investing money, usually given as a percentage.	If you invest £100 at 5% interest , you'll earn £5 over a year.
invest	To put money into something, like a bank account, in the hope of making a profit or earning interest.	He decided to invest his savings in stocks to grow his money over time.
multiplier	A number used to multiply another to increase its value by a certain factor.	To find 20% of a number, you can use the multiplier 0.2.
percentage	A way to express a number as a part of 100, using the % symbol.	A percentage is out of 100.

Maths | Fractions and Percentages | Skills Guide

Dexter makes 20 cookies.

He eats 6 of the cookies and takes the rest to school.

What percentage of the cookies does he take to school?

$$20 - 6 = 14 \text{ takes}$$

$$\frac{14}{20} = \frac{70}{100} = 70\%$$

In a sale, the price of a bike is reduced by 40%

The sale price of the bike is £192

How much did the bike cost before the sale?

$$60\% = 192 \downarrow \div 6$$

$$10\% = 32 \downarrow \div 6$$

$$100\% = \pounds 320 \downarrow \times 10$$

There are 40 students in a class.

60% of the students are boys.

25% of the boys have brown hair.

How many boys have brown hair?

$$60\% \text{ of } 40$$

$$= 10\% \text{ of } 40 = 4$$

$$= 60\% \text{ of } 40 = 24 \downarrow \times 6$$

$$25\% \text{ of } 24$$

$$\hookrightarrow \frac{1}{4} \text{ of } 24 = 6$$

Y8 Spring Term: Block 5 – Standard Index Form

Previous Block:
Fractions and Percentages

Next Block:
Number Sense

I can add and subtract numbers in standard form.

Addition and Subtraction

Tip: Convert into ordinary numbers first and back to standard form at the end.

Method 1

- 600000 + 800000
- 1400000
- 1.4×10^6

More robust method
Less room for misconceptions
Easier to do calculations with negative indices
Can use for different powers

$$6 \times 10^5 + 8 \times 10^5$$

Method 2

- $(6 + 8) \times 10^5$
- 14×10^5
- 1.4×10^6
- 1.4×10^6

This is not the final answer

Only works if the powers are the same

I can multiply and divide numbers in standard form.

Multiplication and division

$$\frac{1.5 \times 10^5}{0.3 \times 10^3}$$

Division questions can look like this

For multiplication and division you can look at the values for A and the powers of 10 as two separate calculations

$$(1.5 \times 10^5) \div (0.3 \times 10^3)$$

$$(1.5 \div 0.3) \times 10^5 - 10^3$$

$$= 5 \times 10^2$$

Revisit addition and subtraction laws for indices – they are needed for the calculations

Addition law for indices
 $a^m \times a^n = a^{m+n}$

Subtraction law for indices
 $a^m \div a^n = a^{m-n}$

I can order numbers in standard form.

Order numbers in standard form

10^2	10^1	10^0	10^{-1}	10^{-2}	10^{-3}	10^{-4}
--------	--------	--------	-----------	-----------	-----------	-----------

6.4×10^{-2} 2.4×10^2 3.3×10^0 1.3×10^{-1}
 0.064 240 1 0.13

Look at the power first
will the number be $>$ or $<$ than 1

Use a place value grid to compare the numbers for ordering

I can write small numbers in standard form.

Numbers between 0 and 1

0.054
 $= 5.4 \times 10^{-2}$

1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
10^0	10^{-1}	10^{-2}	10^{-3}
0	0	5	4

A negative power does not mean a negative answer – it means a number closer to 0

I can use powers of 10.

0.001	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
$1 \times \frac{1}{1000}$	10^1	10^0	10^{-1}	10^{-2}	10^{-3}
1×10^{-3}	0	0	0	0	1

Any value to the power 0 always = 1

Negative powers do not indicate negative solutions

I can use the addition and subtraction law for indices.

Positive powers of 10

1 billion = 1 000 000 000

$$10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 = 10^9$$

Addition rule for indices $10^a \times 10^b = 10^{a+b}$

Subtraction rule for indices $10^a \div 10^b = 10^{a-b}$

I can write large numbers in standard form.

Any number between 1 and less than 10 $\rightarrow A \times 10^n$ \leftarrow Any integer

Example

$$3.2 \times 10^4 = 3.2 \times 10 \times 10 \times 10 \times 10 = 32000$$

Non-example

$(0.8) \times 10^4$
 $5.3 \times 10^{(0.7)}$

Maths | Standard Index Form | Topic Dictionary

Key Word	Definition	In a sentence
base	In a power, the base is the number that is multiplied by itself according to the exponent.	In 5 to the power of 3, 5 is the base , meaning 5 is multiplied by itself 3 times.
commutative	A property of addition and multiplication where the order of numbers does not change the result.	Addition is commutative because $3+4$ is the same as $4+3$.
exponent	The small raised number in a power that shows how many times the base is multiplied by itself.	In 2 to the power of 4, the exponent is 4, meaning $2 \times 2 \times 2 \times 2$.
indices	Another word for exponents or powers, showing repeated multiplication of a base number.	The expression 3 to the power of 2 has an index of 2.
place value	The value of a digit depending on its position in a number.	In the number 543, the digit 5 is in giving it a place value of 500.
reciprocal	The result of swapping the numerator and denominator; when multiplied with the original number, it equals 1.	The reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$.
scientific notation	A way to write very large or very small numbers using powers of 10, often used in science.	In scientific notation , 300,000 can be written as 3×10 to the power of 5.

Maths | Standard Index Form | Skills Guide

Put these cards in ascending order.

$$8^{-2}$$

$$-8^2$$

$$\frac{1}{8^3}$$

$$8^{-\frac{1}{3}}$$

$$8^{-2} = 0.015625 \quad \textcircled{2}$$

$$-8^2 = -64 \quad \textcircled{1}$$

$$8^{\frac{1}{3}} = 2 \quad \textcircled{4}$$

$$8^{-\frac{1}{3}} = 0.5 \quad \textcircled{3}$$

$$-8^2, 8^{-2}, 8^{-\frac{1}{3}}, 8^{\frac{1}{3}}$$

In a search engine, 40 000 searches are done every minute.

How many searches are done in an hour?

Write your answer in standard index form.

$$\begin{aligned} 40000 \times 60 \\ = 2400000 \\ = 2.4 \times 10^6 \end{aligned}$$

Jack calculates $3 \times 10^2 + 2 \times 10^3 = 5 \times 10^5$

Explain Jack's mistake, and write in the correct answer in standard index form.

$$\begin{aligned} 300 + 2000 &= 2300 \\ \text{which} &\neq 500000 \end{aligned}$$

Y8 Spring Term: Block 6 – Number Sense

Previous Block:
Standard index form

I can use the correct unit of measurement

Metric measures of length

Kilo = 1000 x meter Centi = $\frac{1}{100}$ x meter

Milli = $\frac{1}{1000}$ x meter

Units of weight/ capacity

Weight = g, kg, t
Capacity (volume of liquid) = ml, L

I can do problems with time

Time and the calendar



1 Year – the amount of time it takes Earth to go around the sun 365 (and a quarter) days
Leap Year – 366 days (every 4 years)

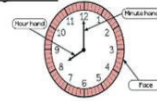


12 Months – one year = 52 weeks
31 days – Jan, March, May, July, Aug, Oct, Dec
30 days – April, June, Sept, Nov
28 days – Feb (29 leap year)

1 day – 24 hours
1 hour – 60 minutes
1 minute – 60 seconds

Use a number line for time calculations!

Analogue Clock



12-hour clock

- Use am (morning) and pm (afternoon)
- Only use hour times up to 12

Digital Clock (24-hour times)



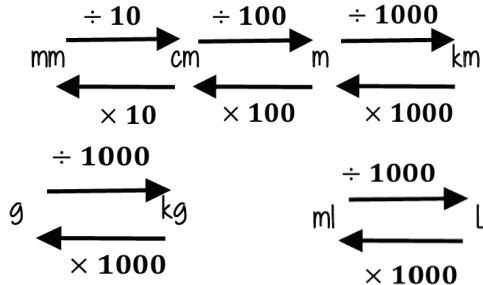
24-hour clock

- 0-11 (morning hours)
- 12-23 (afternoon hours)

Next Block:
Angles in parallel lines

I can do useful conversion

Useful Conversions



I can solve calculation with money

Calculations with money

Debit – You have £0 or more in an account

Credit – You have less than £0 in an account

Money calculations are to 2dp



Using a calculator – ensure you are working in the correct units
£1.30 + 50p = 130 + 50 (in pence)
= 130 + 0.50 (in pounds)

£1 = 100p

I can use order of operations to solve problems

Order of operations

Brackets Operations in brackets are calculated first

Other operations e.g powers, roots,

Multiplication/ Division

They are carried out in the order from left to right in the question

Addition/ Subtraction

They are carried out in the order from left to right in the question

I can round to powers of 10 and 1 significant figure

If the number is halfway between we "round up"



- 370 to 1 significant figure is 400
- 37 to 1 significant figure is 40
- 37 to 1 significant figure is 4
- 0.37 to 1 significant figure is 0.4
- 0.00037 to 1 significant figure is 0.0004

Round to the first non-zero number

I can round to decimal places

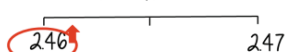
Round to decimal places

"To 1dp" – to one number after the decimal
"To 2dp" – to two numbers after the decimal

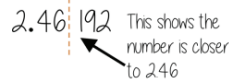
2.46192 (to 1dp) – Is this closer to 2.4 or 2.5



2.46192 (to 2dp) – Is this closer to 2.46 or 2.47



Focus on the numbers after the decimal point



I can estimate by rounding

Estimate the calculation

Round to 1 significant figure to estimate

$4.2 + 6.7 \approx 4 + 7 \approx 11$ This is an **overestimate** because the 6.7 was rounded up more

The equal sign changes to show it is an estimation

$21.4 \times 3.1 \approx 20 \times 3 \approx 60$ This is an **underestimate** because both values were rounded down

It is good to check all calculations with an estimate in all aspects of maths – it helps you identify calculation errors

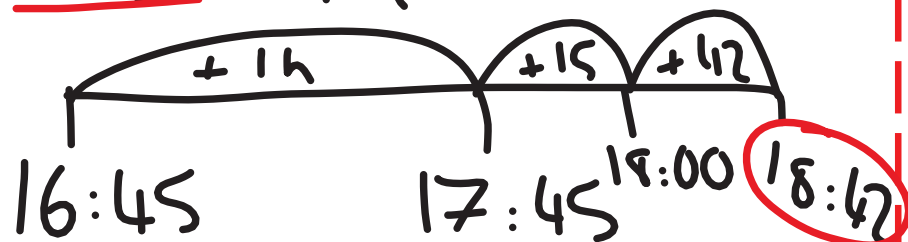
Maths | Number Sense | Topic Dictionary

Key Word	Definition	In a sentence
significant	A value or figure that has importance in determining the precision or accuracy of a number.	The number 2.45 has three significant figures.
round	Simplifying a number to make it easier to use, while keeping it as close as possible to its original value.	If you round 12.7 to the nearest whole number, you get 13.
decimal	A point that separates the whole part of a number from its fractional part in base-10 notation.	The number 3.14 has a decimal after the 3, separating the whole part from the fractional part.
overestimate	To calculate or assume a value higher than the exact or correct one.	If you overestimate the cost as \$20 but it's actually \$15, you'll spend less than expected.
underestimate	To calculate or assume a value lower than the exact or correct one.	She underestimated the time needed for the project and finished later than planned.
metric	A standard unit of measurement based on the decimal system.	In the metric system, distances are measured in meters and kilometres.
balance	The amount of money available in an account at a specific time.	My bank account balance is £500 after I deposited my pay cheque.
deposit	To put money into a bank account or savings account.	She made a \$100 deposit into her savings account.

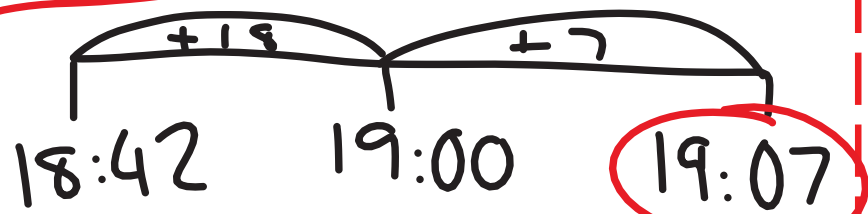
Maths | Number Sense | Skills Guide

Mo has tickets for a film that starts at 16:45
He has also booked a table at a restaurant for 19:30
The film lasts 1 hour 57 minutes.
It takes 25 minutes walk from the cinema to the restaurant.
Will he make it to the restaurant in time?
Show your working.

Film: 1h57



Walk: 25 mins



Statement: Yes →

A bag of oranges weighs 1.5 kg to the nearest 100 g.
Complete the error interval, where x is the weight of the oranges.



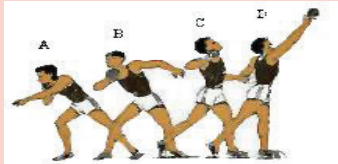
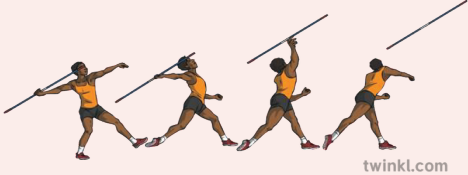
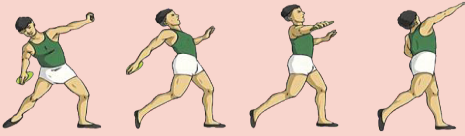
$$1.45 \leq x < 1.55$$

PE | Anatomy and Physiology | Topic Dictionary

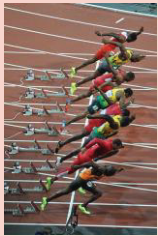

Key word	Definition	Question
blood pressure	The pressure that blood is under	Why is it a bad thing to have high blood pressure ?
artery	Blood vessel with thick muscular walls. Carries blood away from the heart	What is the role of an artery ?
capillary	Thin blood vessel that allows the exchange of oxygen and carbon dioxide from the blood to the muscle	What is the role of a capillary ?
vein	Blood vessel containing valves. Carries blood back towards the heart	What is the role of a vein ?
inspire	Breathing in	Why do we inspire quicker when we start exercising?
expire	Breathing out	Why do we expire quicker when we start exercising?
haemoglobin	The substance in the red blood cells which carries oxygen and carbon dioxide	Why would a performer want higher levels of haemoglobin in their blood?

Athletics Knowledge Organiser

Field Events

Event	Teaching Points	Visual Guidance
Shot put	<ul style="list-style-type: none"> - Stand side on - Make sure you have a 'Dirty neck/fingers, clean palm' - Chin, Knee, Toe are all in line (Tony Chin!) - Aiming at a 45 degree angle - Moving from low to high when releasing the shot - Keep your elbow high 	
Javelin	<ul style="list-style-type: none"> - Stand side on - Arm is extended full behind you - The tip of the javelin in your line of vision - Back leg bent, with your weight on this leg - Elbow comes through first and forearm is extended - Release just above head height 	
Discus	<ul style="list-style-type: none"> - Adopt a shoulder width stance and perform preliminary swings - Release from index finger, top of hand cuts through the air facing upwards - Aim for chin over knee over the toe on the left leg - Power is generated from the legs—swing low to high 	

Track Events

Event	Key facts	Visual Guidance
100m sprint	<ul style="list-style-type: none"> - The shortest common outdoor running distance, it is one of the most popular and prestigious events in the sport of athletics - The 100m places a strong emphasis on reaction time, power and pure speed in order to be successful. - The current men's world record is 9.58 seconds, set by Jamaica's Usain Bolt in 2009, while the women's world record of 10.49 seconds set by American Florence Griffith - Joyner in 1988 remains unbroken. 	
4x100 relay	<ul style="list-style-type: none"> - The 4 × 100 metres relay or sprint relay is an athletics track event run in lanes over one lap of the track, with four runners completing 100 metres each. The first runners must begin in the same stagger as for the individual 400 m race. A relay baton is carried by each runner and handed over at each stage of the relay. - Polished handovers can compensate for a lack of basic speed to some extent, and disqualification for dropping the baton or failing to transfer it within the box is common, even at the highest level. 	

Tennis Knowledge Organiser

Vocabulary

Backhand: a stroke in which the ball is struck on the opposite side of the body to the racquet hand Drop Shot: a gentle shot that just lands just over the net **Forehand:** a shot hit from the racket-arm side of the body

Grip: how to hold the racket in tennis that is hit in a high arc, usually over the opponent's head

Net: the woven barrier dividing a court into halves, over which the ball must be hit

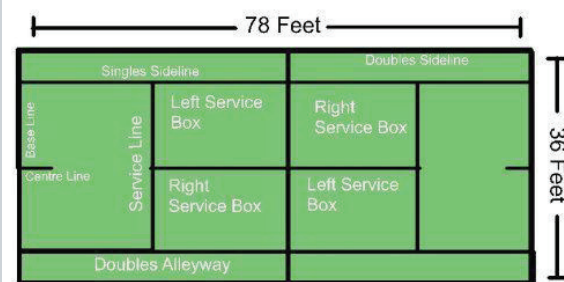
Racket: a stringed 'bat' that players hold and use to hit the ball Rally: a long series of shots

Return: to hit a shot back to the opponent

Umpire: the official who is in overall charge of a match

Volley: a shot on which the ball is hit before it bounces

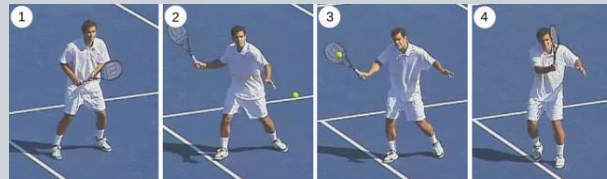
Serve: the shot that begins each point, in which the server hits the ball after tossing it into the air. The serve must go diagonally across the court and bounce in the serving box.



Skills

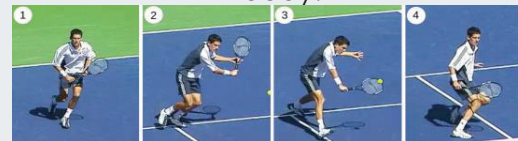
Forehand

A shot hit from the racket-arm side of the body. Usually played as a one-handed shot. Hit the ball side on, creating a 'star' shape with your body and swinging with a low to high swing path.



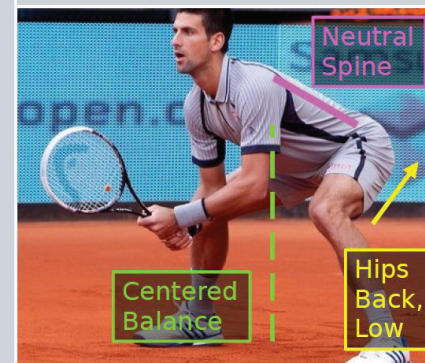
Backhand

A stroke in which the ball is struck on the opposite side of the body to the racquet hand. A backhand shot is now more commonly hit with a two-handed grip, however some players (Federer) will use a one handed grip. Use the same technique as the forehand just from the other side of your body.



Ready Position

Allows a player to be alert, making sure they are on their toes as it enables them to react to where their opponent hits the ball. After a shot is played, returning to the centre of the court is important.



Professional Tennis

Federer is the most successful men's player of all time holding many records, having won 20 Grand Slam titles (he reached 10 finals in a row), 6 ATP Finals, 103 career titles and has spent a record 310 weeks (237 consecutive) as World Number 1!



Williams is the most successful women's player of all time and has won the most Grand Slam titles with 39: Singles 23, Doubles 14, Mixed 2. She is also the most decorated player (along with her sister Venus) in Olympic history with 4 Gold Medals



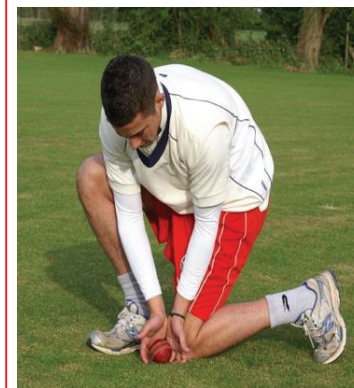
Cricket Knowledge Organiser

Key Knowledge

- There are 11 players in a Cricket team
- The object of the game is score points (called 'runs') by hitting a ball using a bat. The other team must try to get batters 'out' and prevent runs being scored.
- Each time a batsman runs from one wicket to the other, one run is scored
- If the ball reaches the edge of the pitch, or 'boundary', and touches the ground on the way, four runs are scored.
- If the ball passes the boundary without touching the floor, six runs are scored.
- The batsman must protect his/her stumps.
- If the ball hits the stumps and the bails are removed, then the batsman is out.
- A batsman will also be out if he/she hits the stumps with his/her own bat, if a fielding player catches a ball hit by the batsman without it touching the ground and if the ball thrown at the stumps whilst the batsmen are running between the stumps.
- When a batsman is out, this is known as 'taking a wicket'
- Bowlers deliver 6 balls per over and one bowler cannot deliver consecutive overs.
- There are two umpires in place during games. Umpires are responsible for making decisions and notifying the scorers of these decisions.
- Two umpires are in place on the playing field while there is also a third umpire off the field who is in charge of video decisions.

Long Barrier

1. Approach the ball at speed and as you get into line with the ball, twist your upper body, leading with the shoulder furthest from the ball.
2. Bend both knees, so that the knee of the leg nearest to the ball touches the ground, but it is also next to the back of the heel of the other leg.
3. With fingers down and head forward, pick up the ball and then stand back up ready to deliver an overarm throw.



Overarm throwing

1. Your throwing elbow should be at or above shoulder level.
2. Use your non-throwing arm as an aid to the direction of the throw. Try to aim just above the stumps in an imaginary box to make it easy for the wicketkeeper to catch or one bounce.
3. Look at your target at all times to ensure the direction of the throw is accurate.

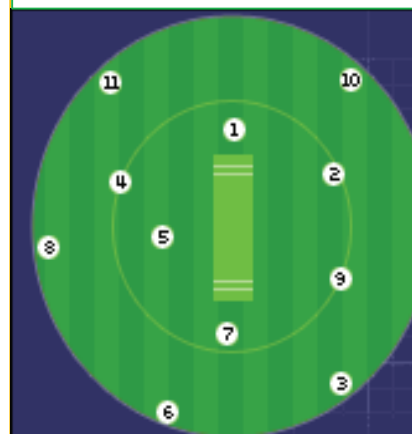


Straight drive

1. As your eyes remain fixed on the ball, lead with the front shoulder.
2. The front foot and a bent front knee form the base for the shot.
3. The head should at least be level or in advance of the front knee, with the back foot up on the inside of the big toe.
4. The bat accelerates vertically and contact with the ball is made with the eyes directly above.
5. The bat then accelerates through a straight path, with wrists relaxing to enable the bat to finish over the front shoulder with the face of the bat facing the sky.



Fielding positions



- 1 Wicket-keeper
- 2 Square leg
- 3 Long on
- 4 Point
- 5 Cover
- 6 Long off
- 7 Bowler
- 8 Off-side sweeper
- 9 Leg-side sweeper
- 10 Fine leg
- 11 Third man

Skills Guide

DEFINE

I am able to:

- Define 5 key words from my dictionary, such as:
- Blood pressure
- Artery
- Capillary
- Vein
- Haemoglobin

APPLY

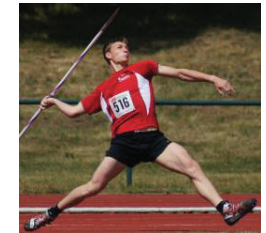
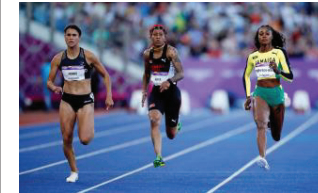
I am able to:

- Describe how key words from my dictionary relate to the chosen sport, for example, why do we inspire and expire quickly when we are running in tennis?
- Describe how arteries, veins and capillaries work together

I am able to:

- Explain why a tennis player, cricket player and an athlete would require higher levels of haemoglobin
- Explain why having a high blood pressure would be a negative thing for a sportsperson











EVALUATE



Challenge:

How can athletes increase the amount of haemoglobin in their body?

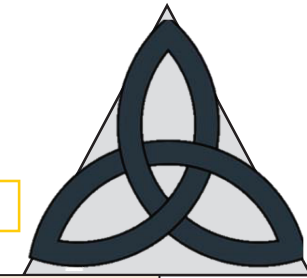
RE | The Shack: Christian Beliefs | Topic Dictionary

Image	Key Word	Definition	In a sentence
	Agnostic	A person who believes that nothing is known or can be known of the existence or nature of God.	I knew that I was agnostic about some things
	Atheist	An atheist is someone who does not believe in the existence of a god or gods.	I wrote ' atheist ' under 'religion' on the form
	Faith	Strong belief in the doctrines of a religion, based on spiritual conviction rather than proof	Consider a faith , a belief system, as a theory about how the universe works.
	Immanent	In Christianity, immanence is the belief that God is present in the world, and that God is active and involved in human history.	God, however defined or understood, is immanent in all things, which is why we must look so directly at the world, even when the world indicts us for being terrible tenants.
	Moral Evil	Moral evil is an act or inaction that is intentionally harmful and considered morally wrong.	Moral evil is any morally negative event caused by the intentional action or inaction of an agent, such as a person. E.g. murder.
	Natural Evil	Natural evil is a term used to describe suffering or pain that occurs as a result of natural events, rather than human actions	Natural evil is suffering caused by natural events that humans cannot control. Examples include Earthquakes.
	Punitive	In Christianity, punitive means inflicting punishment, or relating to punishment. It can also refer to actions or words that are vengeful, retaliatory, or retributive.	The Bible advocates punitive justice for some crimes, and restorative justice for others.
	Suffering	The state of undergoing pain, distress, or hardship	The child was not suffering from any physical ailment which could be cured through surgery."
	Transcendent	In Christianity, transcendent means God is above and beyond the human world, and is not limited by time or space	The search for a transcendent level of knowledge
	Trinity	The Trinity is a central Christian belief that God is one being that exists in three distinct persons: the Father, the Son, and the Holy Spirit.	They further believe that he is God, the second person in the Trinity

Knowledge Organiser – The Shack: Trinity



Father (Papa/Eloisa), Spirit (Sarayu), Jesus



1

God the Father

God the Father has a central role as the creator of the universe and the one judging humanity when the Day of Judgement Comes. Thought of as **transcendent** by Christians and theologians he is often represented as an old man looking at humanity from heaven.

2

Nicene Creed

We believe in one God, the Father, the almighty, maker of heaven and earth, of all that is, seen and unseen.

We believe in one Lord, Jesus Christ, the only Son of God, eternally begotten of the Father, God from God, Light from Light, true God from true God, begotten, not made, of one being with the Father. Through him all things were made. For us men and for our salvation he came down from heaven; by the power of the Holy Spirit, he became incarnate of the Virgin Mary, and was made man. For our sake he was crucified under Pontius Pilate; he suffered death and was buried. On the third day he rose again in accordance with the scriptures; he ascended into heaven and is seated at the right hand of the father. He will come again in glory to judge the living and the dead, and his kingdom will have no end.

We believe in the Holy Spirit, the Lord, the giver of life, who proceeds from the Father and the Son. With the Father and the Son he is worshipped and glorified. He has spoken through the Prophets. We believe in one holy catholic and apostolic Church. We acknowledge one baptism for the forgiveness of sins. We look for the resurrection of the dead, and the life of the world to come. Amen

God the Son

The Son or Jesus is thought of as both **immanent and transcendent** (Matthew 1:18-25 and John 1:1) in Christian theology. As Jesus is **God incarnate** humans can connect to Him and the suffering he accepted on humanity's behalf.

Holy Spirit

The Holy Spirit is an **immanent and ever-present** energy of God in the universe. Throughout the Bible the Holy Spirit is believed to give humanity special **talents** to connect them to God. For example, the Spirit is present at the **Pentecost** where it helps the **disciple's** growth the Christian Church.

As a Year 8 RE student, I know ...

1. Christian doctrine of the trinity and qualities of God	
2. The Nicene Creed as the Christian Declaration of Faith	
3. Why people do not believe in God	
4. how Christians reconcile with God	

4

Reconciling with God

Reconciliation is a sacrament. For Christians accepting struggle is a part of life and overcoming it is a part of their journey to God. **In a Christian's life there may be the following moments of doubt:**

1. Suffering and Pain
2. Unanswered Prayers
3. Natural Disasters and Tragedies
4. Injustice and Evil
5. Religious Conflicts and Divisions
6. Personal disappointments and setbacks
7. Loss of faith

3

Atheism and Agnosticism.

Some who struggle to reconcile with God develop an atheist or agnostic worldview. **They may do so for the following reasons:**

- The Problem of Evil** - People wonder why bad things happen if a loving, all-powerful God exists.
- Personal Tragedy** - Experiencing loss or hardship can make someone question their faith.
- Lack of Evidence** - Some people feel there's not enough proof that God or gods are real.
- Different Religions** - Seeing so many different religions can make people wonder which one, if any, is true.
- Upbringing and Culture** - People raised without religion might not feel a need to believe in God.
- Disappointment with Religious Leaders** - When religious leaders act in harmful or hypocritical ways, it can turn people away from faith.
- Feeling Distant from God** - If someone prays and doesn't feel heard, they might stop believing.
- Seeking Their Own Path** - People might decide to explore life's big questions without following any religion

Skills – Biblical Literacy

What are we looking for?	When reading, ask yourself:
Literary Form	<i>How is this story written? Does the story have a specific genre? What meaning can we get from this story?</i>
Author and Audience	<i>Who was the text written by? Why did the author write this story? Who was it written for?</i>
Setting	<i>What is the world this story is set in? What places, roles, people and customs are mentioned?</i>
Meaning	<i>What do you think the author is trying to say with this story? What is this story about: morals, humanity, religion, God?</i>
Our World Today	<i>What can this story teach us about our world today?</i>

READ

John 16:9-33

⁹ Jesus saw that they wanted to ask him about this, so he said to them, "Are you asking one another what I meant when I said, 'In a little while you will see me no more, and then after a little while you will see me'?" ²⁰ Very truly I tell you, you will weep and mourn while the world rejoices. You will grieve, but your grief will turn to joy. ²¹ **A woman giving birth to a child has pain because her time has come; but when her baby is born she forgets the anguish because of her joy that a child is born into the world.** ²² So with you: Now is your time of grief, but I will see you again and you will rejoice, and no one will take away your joy. ²³ In that day you will no longer ask me anything. **Very truly I tell you, my Father will give you whatever you ask in my name.** ²⁴ **Until now you have not asked for anything in my name. Ask and you will receive, and your joy will be complete.**

²⁵ "Though I have been speaking metaphorically, a time is coming when I will no longer use this kind of language but will tell you plainly about my Father. ²⁶ In that day you will ask in my name. I am not saying that I will ask the Father on your behalf. ²⁷ No, **the Father himself loves you because you have loved me and have believed that I came from God.** ²⁸ **I came from the Father and entered the world; now I am leaving the world and going back to the Father."**

²⁹ Then Jesus' disciples said, "Now you are speaking clearly and without figures of speech. ³⁰ Now we can see that you know all things and that you do not even need to have anyone ask you questions. This makes us believe that you came from God."

³¹ "Do you now believe?" Jesus replied. ³² "A time is coming and in fact has come when you will be scattered, each to your own home. You will leave me all alone. Yet I am not alone, for my Father is with me.










³³ "I have told you these things, so that in me you may have peace. **In this world you will have trouble. But take heart! I have overcome the world."**

EXPLAIN

What are we looking for?	
Literary Form	<i>This story is from the Gospel of John. This gospel gives insight into Jesus' nature as both human and divine.</i>
Author and Audience	<i>Written for Christians and the students of Jesus this extract shows Jesus' awareness of suffering in the world. In this specific moment Jesus is reminding Peter that his faith is not yet strong enough, and that Peter may doubt him.</i>
Setting	<i>The language Jesus is using is metaphorical rather than literal. Verse 32 refers to people "scattering to their own home" which theologians understand as "fleeing".</i>
Meaning	<i>This extract shows Jesus' awareness that even his closest followers will scatter in fear. Through his omniscience Jesus chooses to reflect on the struggles of our lives and reminds Christians to return to having faith in him.</i>
Our World Today	<i>This proves to Christians that suffering is a test on the path to true faith in God. Furthermore, it proves that humans are not instantly capable of trusting in God's plan meaning they should never give up their faith as Peter did not.</i>

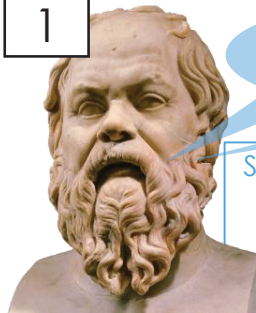
Challenge: What does Jesus say about suffering?

RE | Philosophy | Topic Dictionary

Image	Key Word	Definition	In a sentence
	Atheist	A person who does not believe in the existence of God	I wrote ' atheist ' under 'religion' on the form
	Designer God	The concept of a God who created the universe with a specific design or purpose.	The "design argument" posits that the intricate complexity of the universe points towards the existence of a " designer God ," an intelligent being who created it with purpose
	Immortal	Not subject to death or decay; living forever	What is the point of being immortal if you don't have good health
	Miracle	A surprising and welcome event that is not explicable by natural or scientific laws and is therefore considered to be the work of a supernatural agency such as God.	Doctors and scientists are divided on the merits of searching for the miracle cure.
	Morality	Principles concerning the distinction between right and wrong or good and bad behavior	The morality of a country is judged by the way it treats its animals.
	Physiological	Relating to the branch of biology that deals with the normal functions of living organisms and their parts.	The adoption of this teaching leads to certain desirable physiological consequences in the end product
	Self-actualization	The realization or fulfilment of one's talent and potentialities, especially considered as a drive or need present in everyone.	Prosperity and equality bring greater opportunities for self-actualization
	Socratic Dialogue	A method of teaching by question and answer, designed to lead students to discover truths for themselves.	The philosophy professor used Socratic dialogue in class to encourage critical thinking among her students.
	Theist	A person who believes in the existence of God or gods.	As a theist , she believes in one God who created the universe

Knowledge Organiser – Philosophy

1



Why?
The only thing I know is that I know nothing.

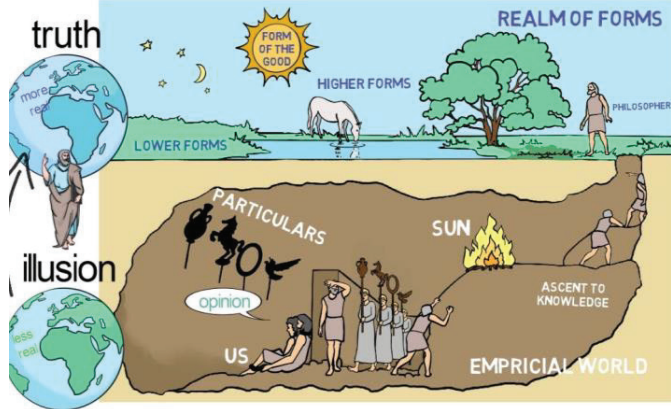
Socrates taught his students by only asking them questions!

Socrates is one of the most respected philosophers in the world. His method of philosophy was so influential philosophers and teachers still use it today. He used questioning to try and find out profound truths about the nature of reality and justice. Many of us may use the Socratic Method without realising it.

As a Year 8 RE student, I know ...

1. What philosophy is	
2. Whether God exists	
3. What happiness means?	

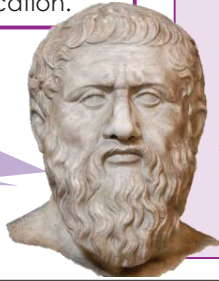
1 PLATO'S ANALOGY OF THE CAVE



Plato was trying to say that people are too happy to accept what they see as being the truth, without questioning it or asking more questions. Like the prisoners we are trapped in our ignorance. He argues that the way to find truth is to become freed from those shackles and make the difficult journey to the 'light' (outside the cave). He believed that the way to do this was through education.

Ignorance is the root and stem of every evil."

Society should be ruled by philosopher kings!



2 The Design Argument (Teleological)

The argument from design tries to show that, because the universe is complex and intricate, it cannot have happened by chance. It must have been planned by an intelligent being. Every working object i.e. a watch had to be designed. This must apply to something as complex as the universe.

Argument from Morality
The argument from morality argued that we have morality from God. As we all have morality, we must agree that God exists.

There are many other famous arguments to prove God.

- Which do you think is strongest?**
- **First Cause Argument:** Everything that exists has a cause. We would not be here without our parents, and they without their parents. All the way back to proverbial Adam and Eve.
 - **Argument from Miracles:** Religions often report of miracles such as Jesus walking on water or Muhammed (pbuh) receiving the Qur'an from an angel. If miracles are real, their cause, God must also be real.
 - **Argument from Perfection:** God is by definition a perfect being. God is all-knowing, all-powerful and all-loving. But is God was truly perfect he must also exist. Existence is another one of God's Qualities!

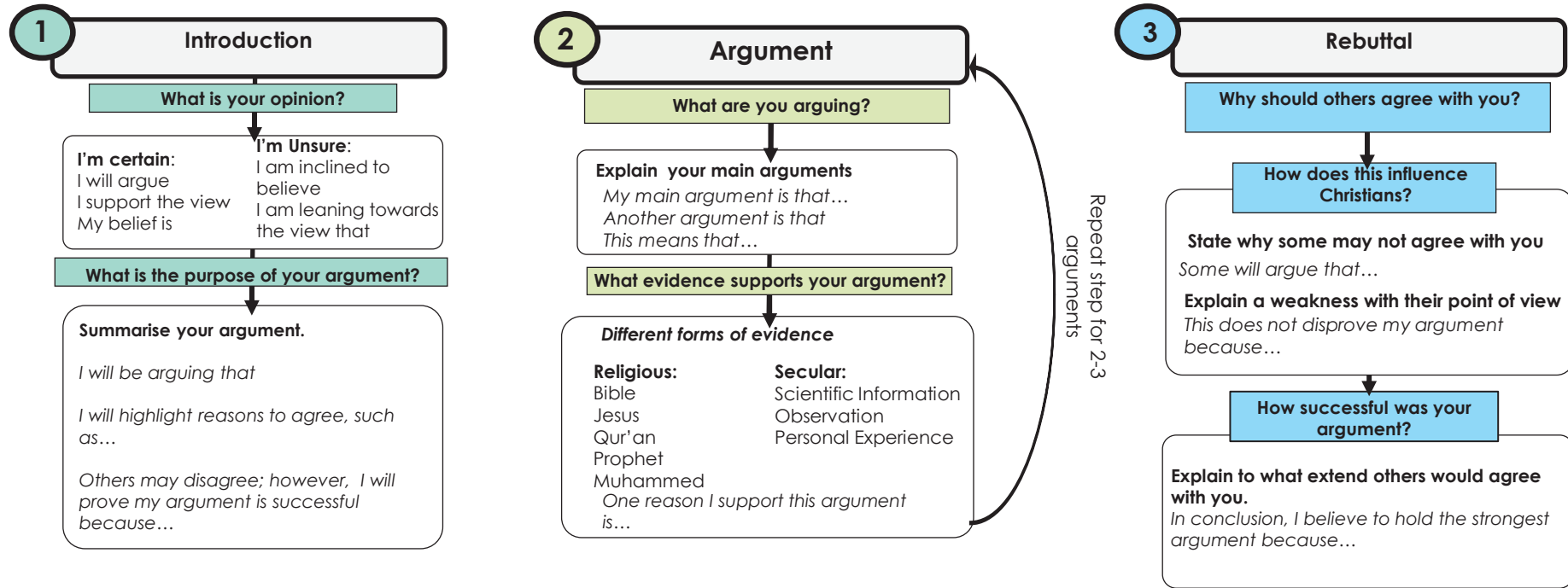
3 Maslow's Hierarchy of Needs



Abraham Harold **Maslow** was an American psychologist. He suggested there are **five hierarchies or levels of need** that explain how people are motivated.

A person will start at the bottom of the hierarchy and will seek to satisfy each need in order. Once the first '**physiological**' need is satisfied it no longer acts as a motivator.

Skills – Debating in RE



Model Paragraph: "God does not exist. To what extent do you agree?"

- 1** I will argue that atheists cannot disprove God's existence. I will highlight reasons to agree such as the variety of arguments that prove God's existence. These arguments include the argument from design and the first cause argument.
- 2** My first argument is the design argument. This argument claims that everything in the world, which is complex has a designer. This is a logical claim. We know that a watch has a maker as someone had to put a watch together in a very specific way for it to work, This links to how the universe works. The universe and all the planets and stars in it came together in such a way that there is life on our planet. This shows a great amount of detail in design. Who could design such a thing? I believe it is fair to say that only an all powerful and all knowing God could. Therefore, if we believe the universe exists, and we know it does, we also have to accept the claim that God exists too.
- 3** Some will argue that the design argument is flawed as there are other explanations for the design of the universe or human life. For example, the theory of evolution can imply that human life exists due to millions of random mutations which led to human life on earth. This makes sense but it does not answer the question: Who designed the process of evolution?
- In conclusions, I believe that I hold the strongest argument is the design argument as it offers a logical solution to the question of God's existence.

Assessment Questions (Year 8) – Test Yourself

Value of Creation

1. Name the book which contains the Creation Story.
2. Define Stewardship.
3. Explain the difference between stewardship and dominion.
4. Define speciesism.
5. Explain one reason to support animal rights.
6. Explain one reason to oppose vegetarianism.
7. Give three ways one can be a good steward.
8. Express one Christian response to climate change.
9. Explain what sanctity of life means to Christians.
10. Define intrinsic value.

The Bible

1. What is the first book of the Bible?
2. What is the last book of the Bible?
3. Define Genre.
4. How many books does the Bible contain?
5. Name the two parts of the Bible.
6. Define Prophecy.
7. Explain one prophecy about the Messiah.
8. State the names of the 4 Gospels.
9. Define fundamentalist Christian, Define liberal Christian,
10. Give one reason the Bible is still relevant today.

The Sacraments

1. Define sacrament.
2. State the two denominations which believe in the 7 Sacraments.
3. Name a commonly practiced sacrament in the Protestant denomination.
4. Explain the difference between an infant and a believer's baptism.
5. Give the direct translation of the word Eucharist.
6. Explain a Catholic belief about the Holy Communion.
7. Which denominations of Christianity do not practice the Holy Communion?
8. Give a reason marriage is considered a sacrament.
9. What is the difference between a baptism and a confirmation?

Hindu Dharma

1. Define Sanatana Dharma.
2. Explain one reason the Hindu faith is polytheistic.
3. What is Brahman?
4. Name the three Gods of the Trimurti.
5. Explain the three different roles of the Trimurti.
6. Name three objects found in a Hindu mandir.
7. State three objects found on a puja tray.
8. Explain the importance of the Ganges River for a Hindu today.
9. Which God is connected to the Ganges River?

Philosophy

1. Define Philosophy.
2. Name one Ancient Philosopher.
3. Explain how to use the Socratic Method in dialogue.
4. Explain what a thought experiment is.
5. What is at the foundation of Maslow's hierarchy of needs.
6. Name one criticism of Maslow's hierarchy of needs.
7. Give one argument in support of the existence of God.
8. Give one argument against the existence of God.
9. What is the teleological argument?

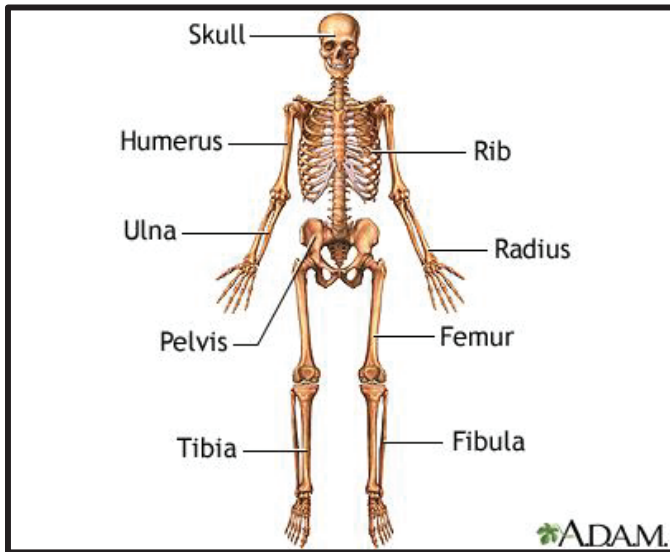
The Shack

1. What is the Trinity?
2. Define suffering.
3. Explain the difference between natural and moral evil.
4. Explain the Problem of evil.
5. State one Christian counterargument to the Problem of evil.
6. What is the role of the Holy Spirit?
7. What is the importance of Jesus' incarnation?
8. Who is Wisdom in the Bible?
9. State one Christian teaching about the nature of God.
10. Explain the moral behind The Shack.

Science | Coordination | Knowledge Organiser

The Skeleton

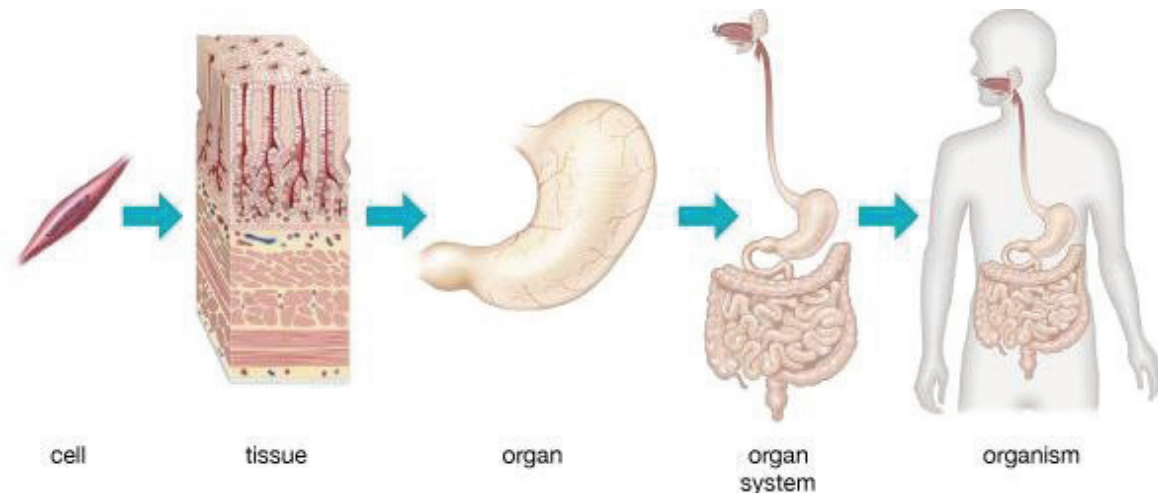
- The **four functions of the skeleton** are support for the body, movement, protection of vital organs and making and storage of blood cells.
- The synovial fluid **reduces friction** when bones move within a joint.



Biomechanics

- A muscle is a tissue that **contracts and relaxes**.
- A muscle's function is to bring about **movement**.
- The **three main types of muscle** are smooth, cardiac and skeletal muscle.
- **Smooth muscle** is found on the walls of hollow organs (e.g., intestine, stomach).
- **Cardiac muscle** is found in the heart.
- **Skeletal muscle** covers the skeleton.
- **Tendons** are tissue that connects muscle to the bone.
- **Antagonistic muscles** are muscle pairs that oppose the action of each other,
- **Biceps and triceps** are an example of a pair of antagonistic muscles.
- When muscles contract, they **exert a force** on the bone.

Principles of Organisation



As a Year 8 Scientist, I know...

1. The function of a skeleton.
2. How muscles help us to move.
3. How structures within an organism are organised.

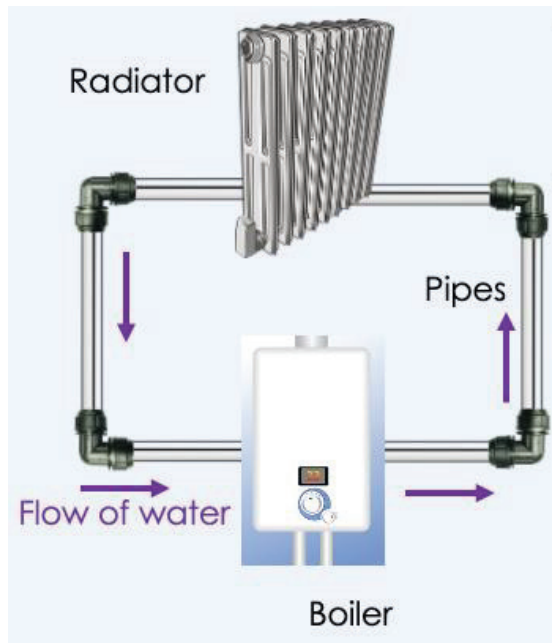
Science | Coordination | Topic Dictionary

Word	Definition	In a sentence...
antagonistic pair	Two muscles which carry out opposite actions at the same time to bring about a change in movement.	The bicep and triceps muscles cause movement of the arm because they work as an antagonistic pair .
bicep	The large muscle at the front of the upper arm.	Doing push-ups strengthens your biceps .
bone marrow	Soft tissue found inside bones that produces blood cells.	Human bone marrow produces billions of red blood cells every day!
cartilage	A strong, smooth, elastic tissue.	A layer of cartilage between bones in a joint, prevents them from rubbing together and causing friction.
contract	To become smaller.	The bicep muscle contracts as the triceps muscle relaxes.
intercostal muscles	Muscles found in between the ribs that cause the ribcage to move.	When breathing in, the intercostal muscles contract causing the ribcage to move upwards and outwards.
joint	A part of the skeleton where two bones meet.	The elbow and knee are examples of joints .
ligament	A connective tissue that holds bones together at a joint.	The anterior cruciate ligament (ACL) holds bones together at the knee joint. This ligament can be damaged in sports injuries.
muscle	A type of tissue that can contract and relax.	The action of muscles contracting and relaxing, causes the skeleton to move.
organ	A group of tissues working together in an organism which performs a specific function.	The heart is an organ because it is made from muscle tissue and connective tissue.
organ system	A group of organs that work together to perform a specific function.	The respiratory system is an organ system because it is comprised of several organs working together, including the mouth, lungs and trachea.
relax	To become less firm or tight.	As the bicep muscle relaxes it becomes longer in length.
skeleton	The connected structure of bones in animals.	The skeleton supports, protects and allows movement of the body.
tendon	A connective tissue that connects muscle to a bone at a joint.	A tendon attaches the bicep muscle to a bone in the arm.
tissue	A group of similar cells working together.	Many muscle cells working together form a muscle tissue
triceps	The large muscle at the back of the upper arm	Triceps dips are a great way to work out the muscles in your arm.

Science | Electrical Circuits | Knowledge Organiser

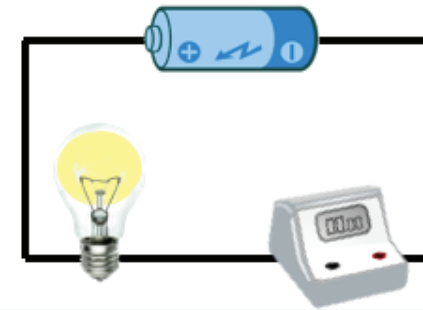
Models of Electricity

- Electric circuits can be described using **models**, like a heating system.
- No model is perfect because they are not the same as the real thing.
- **Increasing the current in a heating system** means more water is flowing through the pipes each second.
- **Increasing the current in a circuit** means more charges flow through the wire each second.
- **Turning up the temperature on a boiler** means more thermal energy is given to the water, and the radiator gets hotter.
- **Increasing the voltage by adding batteries** means more energy is given to the charges and the bulbs shine brighter.

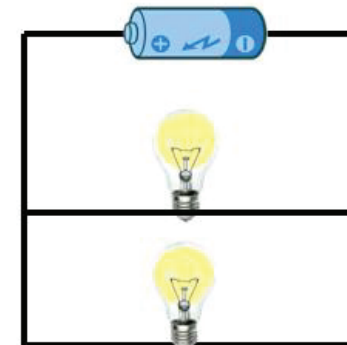


Series and Parallel Circuits

- A complete circuit has no gaps, so the electricity can flow all around in a loop.
- If the circuit is **incomplete**, the electricity cannot flow.
- If all of the components are connected into one main loop, it is a **series circuit**



- If there's more than one loop with junctions, it's a **parallel circuit**.



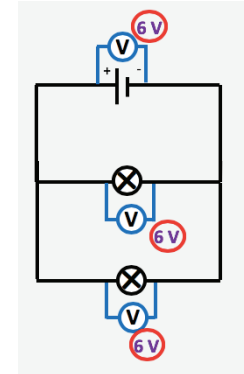
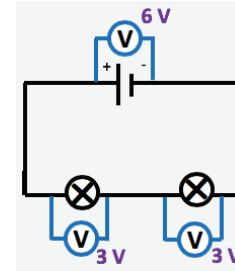
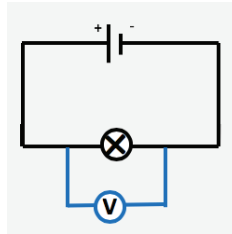
Science | Electrical Circuits | Knowledge Organiser

Circuit Components

Circuit Symbol	Component Name	Function
1.	Cell	Push charges around the circuit.
2.	Battery	Supplies electrical energy
3.	Bulb/Lamp	Lights up
4.	Ammeter	Measures current
5.	Voltmeter	Measures voltage
6.	Motor	Spins around or moves
7.	Switch	Completes the circuit
8.	Buzzer	Makes a sound

Voltage

1. Voltage is measured in **Volts (V)** by a **Voltmeter**.
2. Voltmeters are connected **in parallel**.
3. **Voltage** is the amount of energy shifted from the power source to the moving charges, or from the charges to the circuit component.
4. Adding voltage (adding batteries) **increases** the **current** and increases the **brightness** of bulbs.
5. The voltage in a series circuit is shared between components.
6. The voltage across the cell is equal to the voltage on each pathway of a parallel circuit.



Current

- Current is the rate of flow of charge and is measured in Amperes/**Amps (A)** by an **Ammeter**.
- Ammeters are placed **in series**.
- Current transfers **energy** from one place to another.
- Current can be calculated using the equation:

$$\text{Current} = \frac{\text{Charge}}{\text{Time}}$$

- Charge is measured in Coulombs (C) and time is measured in seconds (s).
- The brightness of a bulb is increased by adding cells/ batteries and decreased by adding more bulbs (components).
- Current is the **same everywhere** in a **series** circuit.
- Current **splits** at the **junctions** in a **parallel** circuit.

Science | Electrical Circuits | Topic Dictionary

Word	Definition	In a sentence...
ammeter	A component used to measure current in electrical circuits, connected in series.	Ammeters measure current in Amps.
ampères (amps)	The unit of measurement for current.	The current in the circuit was 2 Ampères/Amps (A) .
battery	Two or more cells connected.	A battery is a power source in an electrical circuit.
cell	A single energy source that can be used to power an electrical circuit.	A cell is a power source in an electrical circuit.
charge	Particles that transfer energy in an electrical circuit.	The SI unit for charge is the Coulomb.
component	Any device in an electrical circuit.	Components in a circuit can be connected in series or parallel.
current	The rate of flow of charge.	The current in a circuit is measured using an ammeter.
electrical conductor	A material that allows current to flow through it easily.	Metals are electrical conductors .
electrical insulator	A material that does not allow current to flow through it easily.	Rubber is an electrical insulator .
energy	The ability or capacity to do work.	Energy cannot be created or destroyed.
junction	A point in a parallel circuit where the current can split.	The different branches in a parallel circuit split at a junction .
parallel	A circuit in which there is more than one branch through which current can flow.	Current splits at branches in a parallel circuit.
series	A circuit in which there is only one branch through which current can flow.	Current is the same at all points in a series circuit.
switch	A component that can be open or closed to control current flow.	When a switch is open, the circuit is incomplete.
voltage	The amount of energy transferred from the power source to the moving charges or from the charges to the component.	Adding another cell can increase the voltage in a circuit.
voltmeter	A component used to measure voltage in electrical circuits, connected in parallel.	Voltmeters measure voltage in Volts.
volts	The unit of measurement for voltage.	The voltage across the bulb was 5 Volts (V) .

Science | Genetics | Knowledge Organiser

DNA

- Long polymer made of two strands
- Organised into chromosomes
- Different organisms have different amount off chromosome (e.g. humans have 46)
- A small section of DNA is called a gene



The Genome

Knowing the genome can benefit scientist in the following areas:

- To search for **genes** to different types of diseases
- Understanding and treating inherited diseases
- Tracing human migration

Punnett square example

- Dimples are **dominant** (D) to no dimples (d).
- The **genotype** for a person with dimples can be DD or Dd, and the **genotype** for a person with no dimples is dd.

	Father (homozygous dominant)	
Mother (homozygous recessive)	D	D
	d	Dd
	Dd	Dd

	Father (heterozygous)	
Mother (homozygous recessive)	D	d
	d	Dd
	Dd	dd

- 50% chance of offspring having dimples.
- 50% chance of offspring not having dimples

➤ All possible offspring have dimples, as they are heterozygous

Inheritance in action

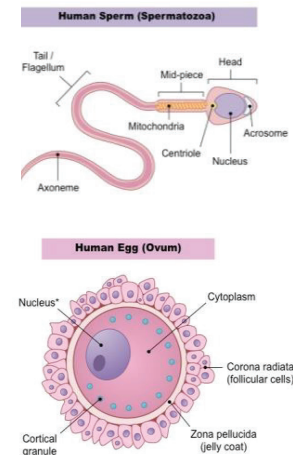
- Some characteristics are controlled by a single **gene**
 - This **gene** may have different **alleles**
- **Punnett squares** can be used to predict the probability of inheriting certain characteristics

Sex determination

- Humans have 23 pairs of chromosomes, one pair being the sex chromosomes
- Human females have two X chromosomes (XX), human males have one X and one Y chromosome (XY).
- All egg cells will have one X chromosome
- Sperm cells will either have one X or one Y chromosome

	Father	
Mother	X	Y
	X	XY
	XX	XY

- The chances of having a boy or a girl is 1:1



Science | Genetics | Topic Dictionary

Key term	Definition	In a sentence
allele	A different version of the same gene.	Each parent contributes one allele for every gene, which together determine the traits of their offspring.
dominant	An allele that is always expressed, even if one copy is present. Dominant alleles are always represented by a capital letter for example, you could use the letter B.	I have blue eyes this is because I inherited a dominant allele.
gene	A short section of DNA that codes for a characteristic for example, eye colour.	People inherit two genes for each characteristic.
genome	The entire genetic material of an organism.	The entire genome is made of 3.2 billion base pairs.
genotype	The genes you inherit.	My genotype for eye colour is Bb.
heterozygous	An individual with the same alleles for a characteristic (e.g. BB or bb).	If you inherit two different genes for a characteristic it is heterozygous .
homozygous	An individual with different alleles for a characteristic (e.g. Bb).	If you inherit two different genes for a characteristic it is homozygous .
mutation	A change in the DNA.	The rapid mutation of the virus made it challenging for scientists to develop an effective vaccine.
phenotype	The physical expression of the gene (the characteristic you see).	My phenotype depends on my genotype.
punnet square	A way of modelling genetic cross and predicting the outcome of offspring using probability.	I can use a Punnett square to determine the probability that my children will inherit a specific characteristic.
recessive	An allele that is only expressed if the individual has two copies and does not have the dominant allele of that gene. Recessive alleles are always represented by a lowercase letter for example, you could use the letter b.	I have brown eyes because I inherited two recessive alleles.

Science | Reactivity

Explaining Trends

Getting more reactive

- Li
- Na
- K
- Rb
- Cs

Trends in reactivity as you go down the group can be explained in terms of the **attraction** between electrons in the **outermost shell** and the **nucleus**.

In deciding how easy it is for **atoms to lose or gain electrons** from their outermost shell depends on three factors:

- The **size of the atom**
- The **shielding effect of inner electrons**, and
- The **nuclear charge**

- F
- Cl
- Br
- I
- At

Getting less reactive

Group 7 - Halogens

Consist of molecules made of a pair of atoms	Have seven electrons in their outer shell. Form -1 ions.
Melting and boiling points increase down the group (gas → liquid → solid)	Increasing atomic mass number.
Reactivity decreases down the group	Increasing proton number means an electron is more easily gained

Group 1 – Alkali Metals

The alkali metals (group 1 elements) are soft and **very reactive** metals.

- They all have **one electron** on their **outer shell**, making them very reactive.
- They are low density.
- As you go down the group, they become more reactive
- They get bigger and it is easier to **lose** an electron that is further away from the nucleus.
- They form ionic compounds with non-metals.
- They react with water to

Reactions of Alkali Metals

With oxygen	Forms a metal oxide	Metal + oxygen → metal oxide	e.g. $4\text{Na} + \text{O}_2 \rightarrow 2\text{Na}_2\text{O}$
With water	Forms a metal hydroxide and hydrogen	Metal + water → metal hydroxide + hydrogen	e.g. $2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2$
With chlorine	Forms a metal chloride	Metal + chlorine → metal chloride	e.g. $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$

ISOTOPES and Relative Atomic Mass Calculation

Atoms of the same element with the same number of protons and different numbers of neutrons

^{35}Cl (75%) and ^{37}Cl (25%)

Relative abundance =
 $(\% \text{ isotope 1} \times \text{mass isotope 1}) + (\% \text{ isotope 2} \times \text{mass isotope 2}) \div 100$
 e.g. $(25 \times 37) + (75 \times 35) \div 100 = 35.5$

Reaction	Products	Reaction	Notes
With Metals	Forms a metal halide	Metal + halogen → metal halide e.g. Sodium + chlorine → sodium chloride	e.g. NaCl metal atom loses outer shell electrons and halogen gains an outer shell electron
With Hydrogen	Forms a hydrogen halide	Hydrogen + halogen → hydrogen halide e.g. Hydrogen + bromine → hydrogen bromide	e.g. $\text{Cl}_2 + \text{H}_2 \rightarrow 2\text{HCl}$
With a solution of a halide salt	A more reactive halogen will displace the less reactive halogen from a salt	Chlorine + potassium bromide → potassium chloride + bromine	e.g. $\text{Cl}_2 + 2\text{KBr} \rightarrow 2\text{KCl} + \text{Br}_2$

Science | Reactivity

The Law of Conservation of Mass

The law of conservation of mass states that no atoms are lost or made during a chemical reaction, so the mass of the products equals the mass of the reactants.

This means that chemical reactions can be represented by symbol equations which are balanced in terms of the numbers of atoms of each element involved on both sides of the equation.

Balancing Chemical Equations

Equations need to be **balanced** to have the same number of atoms on each side.

In a balanced chemical equation, the sum of the relative formula masses of the reactants in the quantities shown equals the sum of the relative formula masses of the products in the quantities shown.

Writing Ionic Formulas Ionic Compounds

An **ion** is a charged particle formed when an **atom**, or a group of atoms, loses or gains **electrons**. The number and sign of its electrical charges are shown in **superscript** text.

The formula of an **ionic compound** can be predicted using the formulae of its ions. The numbers of ions in a formula must give an equal number of positive and negative charges.

Chemical Formulas

A chemical **formula** can be used to represent a compound. The formula shows:

- the symbols for each element in the compound
- the number of **atoms** of each element in a unit of the compound

For example, magnesium oxide is made up of two elements, magnesium and oxygen. Its formula is MgO. This shows that it has one atom of magnesium for every one atom of oxygen.

Name of compound	Formula	Name of compound	Formula
Sodium chloride	NaCl	Sulfur trioxide	SO ₃
Potassium bromide	KBr	Water	H ₂ O
Magnesium iodide	MgI ₂	Ammonia	NH ₃
Carbon dioxide	CO ₂	Methane	CH ₄
Carbon monoxide	CO		

Relative Formula Mass

The relative formula mass (Mr) of a compound is the sum of the relative atomic masses of the atoms in the numbers shown in the formula.

Relative Atomic Mass (Ar)

The mass number of an atom A_r of He is 4

Relative Formula Mass (Mr)

The mass of all the atoms of a molecule added together
Mr of H₂O is (2x1) + 16 = 18

Reactivity | Dictionary

Key term	Definition	In a sentence
Conservation of mass	The law of conservation of mass states that mass is neither created nor destroyed in a chemical reactio	After the ice melted, the total mass was still the same, which is a demonstration of the conservation of mass
Chemical reaction	A chemical reaction is a process that involves the rearrangement of the atoms of one or more substances, resulting in the transformation of those substances into new substances with different properties	When Sam placed magnesium in the beaker of hydrochloric acid, he observed the chemical reaction taking place.
Word equation	a word equation represents a chemical reaction using only the names of the substances involved, not their chemical symbols or formulas	The teacher asked the year 8s to write down the word equation for the reaction between iron and oxygen in their books.
Symbol equation	A symbol equation is a way to represent a chemical reaction using chemical formulas and symbols to show the reactants, products, and their proportions.	The teacher asked the class to write a balanced symbol equation for the combustion of methane as part of their KS3 science lesson.
hypothesis	A prediction backed up with a scientific reason saying why you think the prediction is correct.	In science, we made a hypothesis that plants will grow faster if they receive more sunlight.
hazard	Something that causes harm.	The construction site was marked with signs to warn people about the potential hazard of falling debris.

Science | Interdependence | Knowledge Organiser

Ecosystems

- An **ecosystem** is the interaction of a community of organisms with the non-living parts (abiotic factors) of their habitat. *E.g. a rainforest ecosystem contains: gorillas, ants, nut trees, lots of water and lots of sunlight*
- A **population** is a group of the same organism. *E.g. a group of gorillas*
- A **community** is made of several different populations living in the same area that depend on each other for survival. *E.g. populations of: gorillas, ants and nut trees*

Abiotic and Biotic Factors

- **Biotic factors** are **living** things that can affect a community
- Examples of biotic factors are: food, disease and predators
- **Abiotic factors** are **non-living** things that can affect a community
- Examples of abiotic factors are: temperature, light, wind, amount of water

Sampling

- Random sampling is used to estimate the size of a population in a habitat
- **Quadrats** are placed randomly and used to count the number of individuals in a specific area (*e.g. estimating the total number of daisies in a field*)
- Systematic sampling is used to investigate the effect of a factor on the distribution of organisms
- This involves using quadrats placed at regular intervals along a **transect** line (*e.g. counting the number of daisies as you move further away from a pond*)



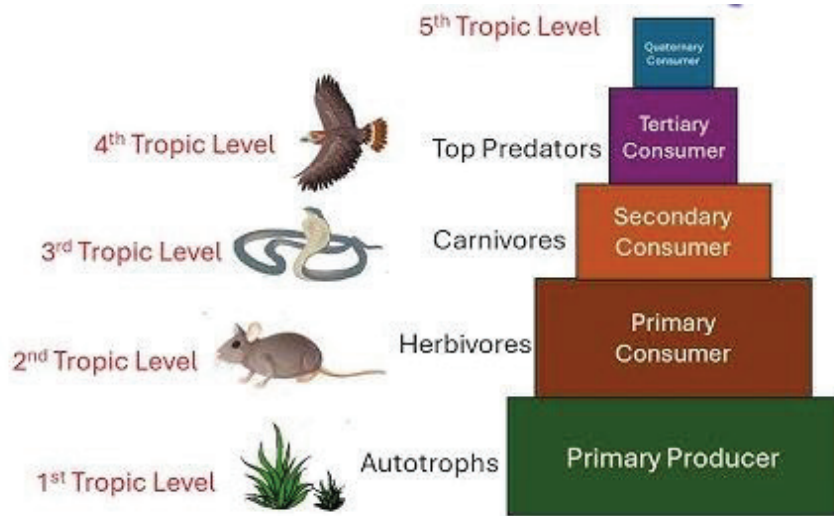
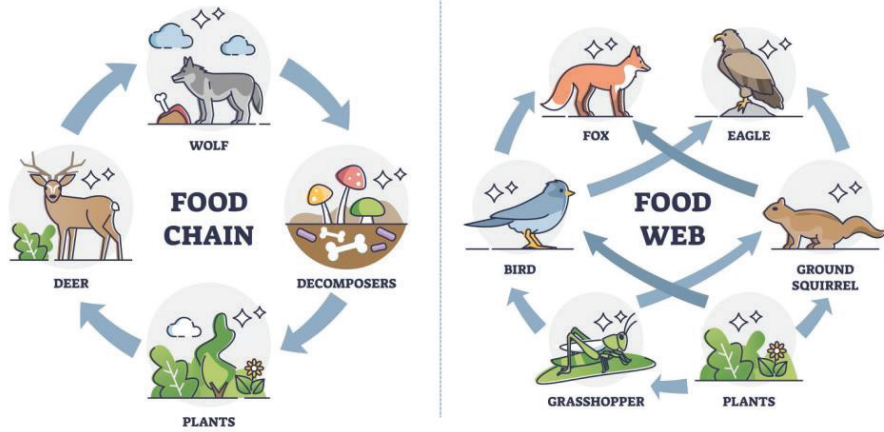
Competition

1. Animals often compete for space, mates and food
2. Plants often compete for space, water, minerals and light
3. The best competitors are most likely to survive

As a Year 7 Scientist, I know...

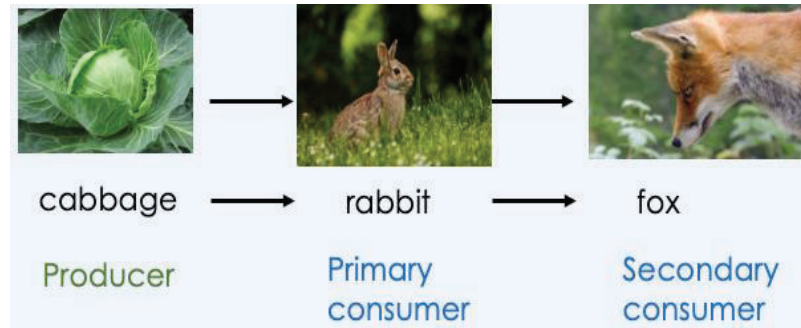
- | | |
|---|--|
| 1. Examples of ecosystems. | |
| 2. How to carry out random sampling. | |
| 3. The difference between abiotic and biotic factors. | |
| 4. What animals and plants compete for. | |
| 5. The difference between food webs and food chains. | |

Science | Interdependence | Knowledge Organiser



Food Chains and Webs

- Feeding relationships within a community can be represented by **food chains** and **food webs**
- The direction of the arrow in a food chain and food web shows the direction of **energy transfer**
- Producers** are plants that can make their own food (glucose) using sunlight in the process of photosynthesis



- Predators** are consumers that eat other animals, called **prey**
- In a **stable community** the numbers of predators and prey increase and decrease in cycles
- If there is a change in one population then this affects other populations in the community. You can use a food web to predict what changes could happen

Science | Interdependence | Topic Dictionary

Word	Definition	In a sentence...
abiotic factor	Something that is not to do with a living thing.	<i>Light, temperature and water availability are all abiotic factors.</i>
biotic factor	Something to do with a living thing.	<i>Food availability, disease and predators are all biotic factors</i>
community	Two or more populations of organisms in the same habitat.	<i>A group of seals and sharks form a community in the ocean.</i>
competition	Where organisms need a resource that has a limited supply.	<i>In the desert habitat, there is competition between plants for water.</i>
consumer	Organisms that cannot make their own food, so must eat other organisms.	<i>All animals are consumers because they cannot make their own food.</i>
ecosystem	Interaction between a community of living organisms and their environment.	<i>An ecosystem is two or more populations of organisms (usually many more) in their environment.</i>
interdependence	All the organisms in an ecosystem depend on each other.	<i>Interdependence involves feeding relationships, pollination and decomposition.</i>
photosynthesis	The process by which green plants use sunlight to make their own food (glucose).	<i>Green plants are producers because they make their own food through photosynthesis.</i>
population	A group of the same type of organism.	<i>Within a forest, there is a population of fir trees.</i>
predator	Consumers that eat other animals.	<i>A fox is the predator of a rabbit.</i>
prey	Animals that are eaten by other animals.	<i>A rabbit is the prey of a fox.</i>
producer	Organisms that can make their own food using photosynthesis.	<i>Plants and algae are examples of producers.</i>
representative	When a sample accurately reflects what the larger thing is like.	<i>Quadrats need to be placed randomly so that they are representative of the total area.</i>
sample	A smaller part of something that gives an idea of the whole.	<i>Before elections, a sample of voters can be asked for their views to predict the final result.</i>

Skills guide - Graphs

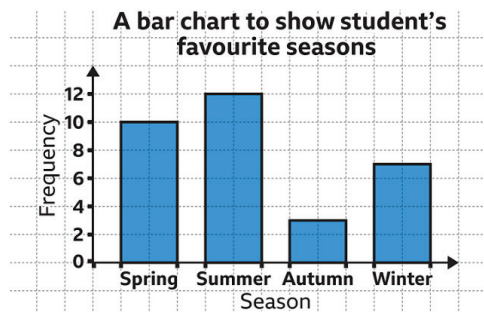
Bar graphs

Discrete data (**categorical**) can be plotted on a bar graph.

To create a bar chart:

1. Look for the largest frequency in your table.
2. Draw a **vertical axis** on your square paper or graph paper – remember to do this in pencil.
3. Choose an appropriate **scale** for this axis and label your axis up to the largest frequency.
4. Look at how many categories are needed for the horizontal axis.
5. Draw and label the **horizontal axis**, remembering to leave spaces for the gaps between the bars.
6. Draw each bar the correct height, based on the frequencies.
7. Check you have labelled each axis correctly and give your bar chart a title. 'A bar chart to show...'

Season	Spring	Summer	Autumn	Winter
Frequency	10	12	3	7



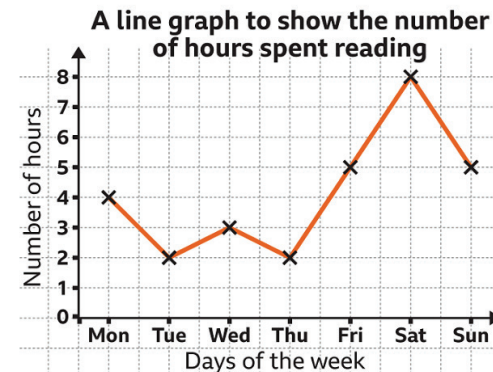
Line Graphs

Most data you meet in science is **continuous** and will require a line graph to represent.

To create a line graph:

1. Look for the largest frequency in your table.
2. Draw a **vertical axis** on your square paper or graph paper.
3. my **independent data** goes onto my x-axis and my **dependant data** goes on my y-axis.
4. Choose an appropriate scale for this axis and label your axis up to the largest frequency.
5. Draw and label the horizontal axis.
6. Plot each data point, based on the frequencies and time intervals.
7. Join each data point to the next, using straight lines.
8. Check you have labelled each axis correctly, and give your line graph a title. 'A line graph to show...'

Season	Spring	Summer	Autumn	Winter
Frequency	10	12	3	7



Skills guide - Calculations

Single step calculation – GUESS

G: given – identify the information you are given in the question

U: unknown – what is the unknown that you have been asked to calculate?

E: Equation – given the information given and that you have been asked to find, recall an equation which links them all.

S: substitute – substitute your information into the equation

S: solve – rearrange your equation if necessary and then use your calculator to solve

Example layout

$V = ?$
 $R = 12\Omega$
 $I = 0.2 \text{ A}$

$$V = IR$$

$$V = 0.2 \times 12$$

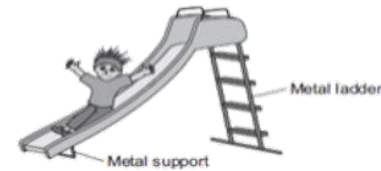
$$V = 2.4V$$

Worked example

In following the **GUESS** method, you may find that you do not have enough values to solve the equation. Typically, this means you need to do an additional calculation.

Example:

The figure below shows a slide in a children's playground.



Sergio has a mass of 30kg and goes down the slide.
 $G = 10 \text{ n/kg}$

The vertical distance from the top to the bottom of the slide is 3m.

Calculate the gravitational potential energy that Sergio has when at the top of the slide.

$$E_p = m \times g \times h$$

$$E_p = ?$$

$$m = 30\text{kg}$$

$$g = 10 \text{ N/Kg}$$

$$h = 3\text{m}$$

$$E_p = m \times g \times h$$

$$E_p = 30 \times 10 \times 3$$

$$E_p = 900 \text{ J}$$

Skills guide - Practical work

Plan

Hypothesis - an idea about how something works that can be tested using experiments.

Scientists ask questions to find out more about the world, like 'how can we get more energy from the sun?' and 'how can we cure diseases?'. To answer these questions scientists do experiments.

Three important types of variables are:

- **Independent variables** – the variable that is being changed during the experiment
- **Dependent variables** – the variable being tested or measured during the experiment
- **Control variables** – the variables kept the same to ensure a fair test.

Worked example

Example 1

Big question 'How does water availability affect plant growth?'

Adding different amounts of water to a plant could affect its growth.



To investigate this, plant some seeds and water each plant with different amount over time.

- The **independent variable** is the volume of water given to each plant.
- The **dependent variable** is how high the plant grows.
- **Control variables** include the size of pots, the type of soil and the position in a room.

Example 2

Big question

'How does the height a ball is dropped affect how high it bounces?'



- The **independent variable** is the height of the drop.
- The **dependent variable** is how high the ball bounces.
- **Control variables** include the type of ball, the surface that it is dropped onto and the size of the ball.

Science | Periodic Table |

The Periodic Table of Elements

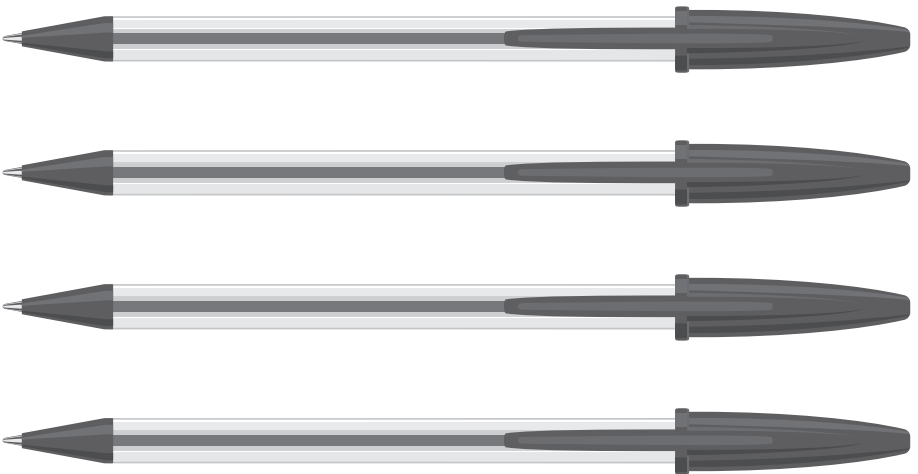
1		2												3	4	5	6	7	0		
				Key relative atomic mass atomic symbol name atomic (proton) number										1 H hydrogen 1							4 He helium 2
														11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10		
														27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18		
7 Li lithium 3		9 Be beryllium 4																			
23 Na sodium 11		24 Mg magnesium 12																			
39 K potassium 19		40 Ca calcium 20		45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36		
85 Rb rubidium 37		88 Sr strontium 38		89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[97] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54		
133 Cs caesium 55		137 Ba barium 56		139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86		
[223] Fr francium 87		[226] Ra radium 88		[227] Ac* actinium 89	[267] Rf rutherfordium 104	[270] Db dubnium 105	[269] Sg seaborgium 106	[270] Bh bohrium 107	[270] Hs hassium 108	[278] Mt meitnerium 109	[281] Ds darmstadtium 110	[281] Rg roentgenium 111	[285] Cn copernicium 112	[286] Nh nihonium 113	[289] Fl flerovium 114	[289] Mc moscovium 115	[293] Lv livermorium 116	[293] Ts tennessine 117	[294] Og oganesson 118		

* The Lanthanides (atomic numbers 58 – 71) and the Actinides (atomic numbers 90 – 103) have been omitted.

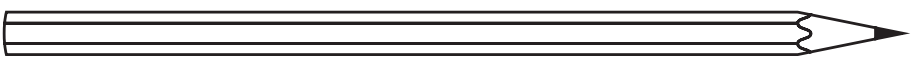
Relative atomic masses for **Cu** and **Cl** have not been rounded to the nearest whole number.

Tools for Learning

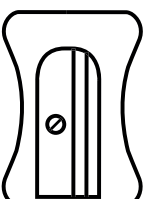
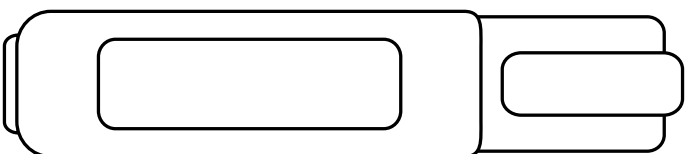
All equipment is available to purchase from the Library



Black or Blue,
Green & Purple Pens



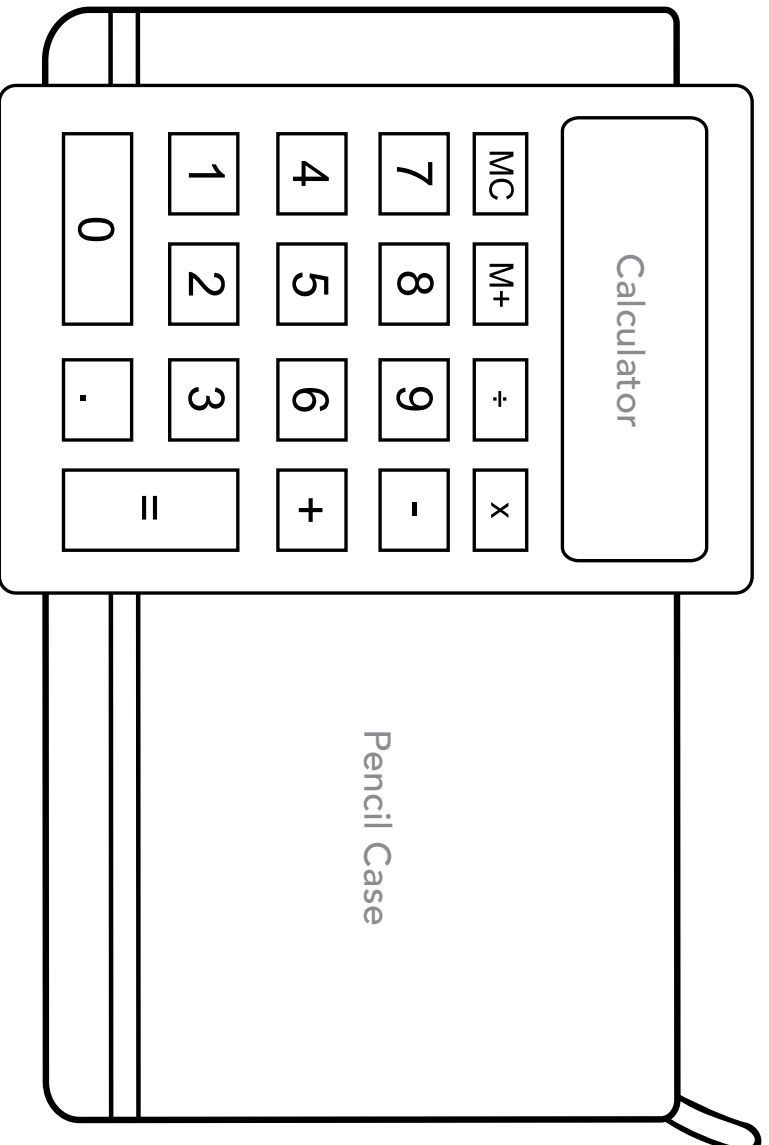
Pencil &
Highlighter



Pencil
Sharpener



Eraser



Calculator

Pencil Case



15cm or 30cm Ruler

anthem

