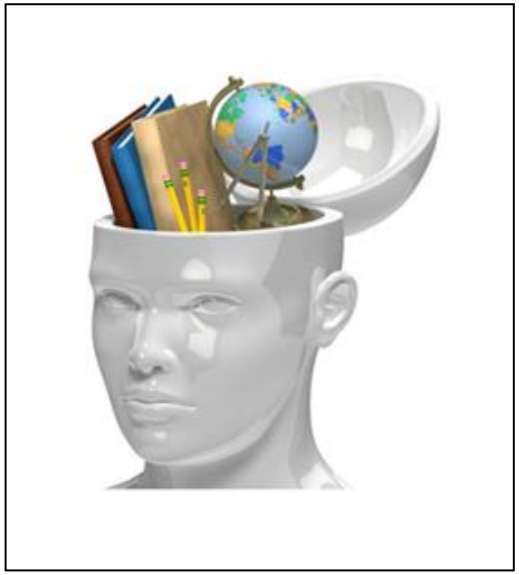
Name: **Form class:**

Year 9

Knowledge Organiser Autumn Term



Instructions for using your Knowledge Organiser

Self-testing

You can use your knowledge organisers and exercise book in a number of different ways but you should not just copy from the Knowledge Organiser into your book.

Below are some possible tasks you could do in your workbooks

- Ask someone to write questions for you
- Write your own challenging questions and then leave it overnight to answer them the next day
- Create mindmaps
- Create flashcards
- Put the key words into new sentences
- Look, cover, write and check
- Mnemonics
- Draw a comic strip of a timeline
- Use the 'clock' template to divide the information into smaller sections. Then test yourself on different sections
- Give yourself spelling tests
- Definition tests
- Draw diagrams of processes
- Draw images and annotate/label them with extra information
- Do further research on the topic
- Create fact files
- Create flowcharts

Presentation

You should take pride in how you present your work; each page should be clearly labelled with underlined title and date. There should be an appropriate amount of work.

The Knowledge Organisers are designed to help you learn a wide range of knowledge which in turn will mean you are more prepared for your lessons as well as the new style GCSEs that you will sit in the future.

To get the most out of your Knowledge Organiser, you should be learning sections and then self testing in your workbook.

Do not just copy into your workbook

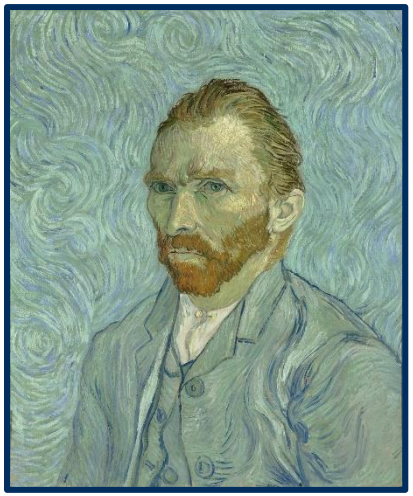
Always check and correct!

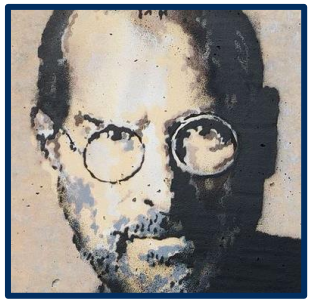
Subject: Art Year 9: Portraits

In this project you will learn to use a wide range of art techniques to explore the work of famous Portrait artists. You will experiment with blending and mark-making. You will be expected to research and show a greater sense of independent learning. Students will be expected to produce a self-portrait using one tone.

Key Artists

Vincent Van Gogh
His use of broad marks makes his style quite unique.
Andy Warhol
His use of repetitive (iconic/famous) images.
Julian Opie
Known for designing illustrated covers for adverts and CD's.
Banksy
Stencil artist, who's spray can art has political response to the world





Key Words

- ✓ **Formal Elements**
- ✓ **Close-up/zoom-in**
- ✓ **Blending**
- ✓ **Harmonious**
- ✓ **Mood**
- ✓ **Proportion**

Key Skills & Knowledge

By the end of the project you should have gained the skills and knowledge to be able to do the following:

1. Understand why Portraits are a form of advertising
2. Can demonstrate observational skills in proportion of facial features
3. Successfully use resources to create a range of art works
4. Present your work to a high standard
5. Have written in more than **30 words** on why you have done a piece of work

Knowledge Organiser: Understanding computers *Discover how computers work*

Summary

Computers require input hardware, processing hardware and output hardware. The hardware that defines a computer is the **CPU** and **memory**. Without these a computer could not function. The CPU and memory work together to run programs.

CPU - executes programs using the **fetch-decode-execute cycle**.

Memory - stores program operations and data while a program is being executed. There are several types of memory, including: **registers, cache, RAM** and **virtual memory**.

Storage - stores programs and files long term, even when they are not in use. Devices such as hard drives, USB memory sticks or SD cards are used to store files such as photos, music and software applications long term.

An **input device** is any piece of computer hardware **used to provide data to a computer system.** Examples include: keyboard, mouse, scanner, digital camera and webcam.

An **output device** is any piece of computer hardware used to communicate the results of data that has been processed.

Key Vocabulary

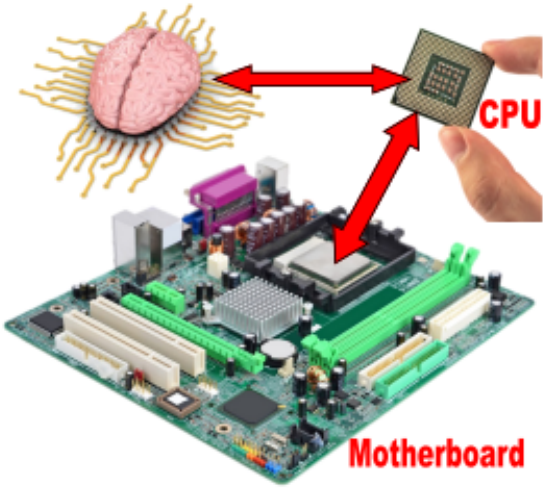
Clock speed	The speed of a computer CPU, measured in hertz.
Cache	A piece of temporary memory. It can refer to a part of the RAM, storage disk, CPU, or an area for storing web pages.
CPU	**C**entral **P**rocessing **U**nit - the brains of the computer that processes program instructions. Also called a **microprocessor**.
Execute	To run a computer program.
GHz	Gigahertz. One billion hertz per second = one gigahertz. This is a measure of frequency and is used to describe bus speeds and CPU clock speeds.
Hardware	The physical parts of a computer system, e.g. a graphics card, hard disk drive and CD drive.
Mother-board	The circuit board inside a computer that houses the CPU, memory and connections to other devices.
RAM	Memory that is constantly being written to and read from. It does not retain its contents without a constant supply of power, i.e. when a computer is turned off, everything stored in its RAM is lost.
Registers	The section of high speed memory within the CPU that stores data to be processed.
Software	Software is the programs that run on a computer.
Virtual memory	A section of a computer storage drive which is temporarily used as RAM.

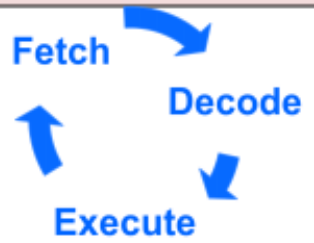
Central Processing Unit

The **Central Processing Unit** or **CPU** is arguably the most important component of a computer.

You can think of the CPU is being like the brain in a human.

It is responsible for all of a computer's processing.





The Fetch – Decode – Execute cycle

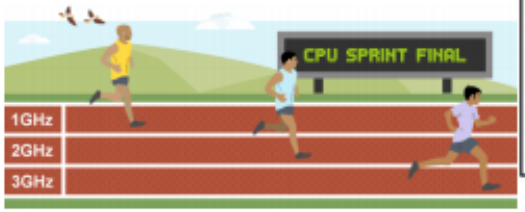
The **CPU** operates by repeating three operations:

FETCH – causes the next instruction and any data involved to be fetched from main memory

DECODE – decodes the instruction to make sure it can be carried out

EXECUTE – carries out the instruction

Repeat...



Binary Units

Remember the units used in the binary system.

1 byte =	8 bits
1 Kilobyte =	1024 bytes
1 Megabyte =	1024 Kilobytes
1 Gigabyte =	1024 Megabytes
1 Terabyte =	1024 Gigabytes

2.4.1 BOOLEAN LOGIC

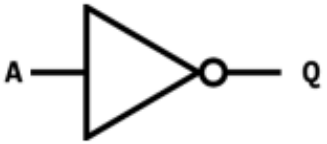
Simple logic diagrams using the operators "AND", "OR" AND "NOT"
Truth tables
Combining Boolean operators using "AND", "OR" and "NOT"
Applying logical operators in truth tables to solve problems

There are a number of different logic gates which produce different results when they receive inputs (1's and 0's.)

Computers are made up of circuits containing millions of switches. As electrical switches have two possible values (**ON** or **OFF**) , these values can be represented using binary values **1** or **0**. Each circuit contains logic gates and **BOOLEAN LOGIC** is used to evaluate the results of different combinations of 1's and 0's.

A **NOT** gate has a single input – **'A'**

NOT gate



A	Q
0	1
1	0

An **OR** gate has two possible inputs – **'A'** and **'B'**

OR gate

A	B	Q
0	0	0
0	1	1
1	0	1
1	1	1

The possible values for each gate can be represented using a **TRUTH TABLE.**

An **AND** gate has two possible inputs - **'A'** and **'B'**

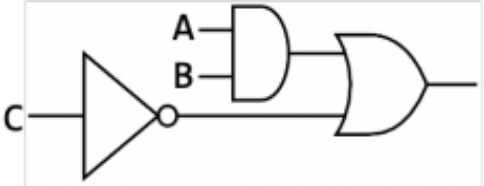
'Q' are the possible outputs

REVISION NOTE
You need to be able draw a truth table for a given circuit. You also need to be able to represent a circuit as a Boolean expression

AND gate

A	B	Q
0	0	0
0	1	0
1	0	0
1	1	1

Logic gates can be combined to create complete circuits. These can also be represented using truth tables. The circuit below is made up of three gates:



This an also be represented as a Boolean expression:

(A AND B) OR (NOT C)

A	B	C	Q
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

Year 8: Drama
Physical Theatre & Theatre

Key Terminology	Definition
Frantic Assembly	• Physical theatre • Devising • Bond between actor and audience
Steven Berkoff	• Total theatre • Abstract theatre • Ensemble work
Konstantin Stanislavski	• Naturalism • Performance based on influence • Workshops
Antonin Artaud	• Theatre of cruelty • Absurd theatre • Surrealism
Paper Birds	• Verbatim • Workshops • Post modern theatre

Watch Physical Theatre

Reading Material

Creating a Physical Theatre performance:

• **Stay safe** • **Focus** • **Timing**	• **Applying movement to music** • **Posture** • **Pace**

KEY QUOTES

"**Reputation** is an **idle** and most **false** imposition"
Iago (Act 2, Scene 3)

"I'll **tear** her all to **pieces**, 'O, blood, blood, **blood!**"
(Othello, Act 3, Scene 3)

"O, beware, my lord, of **jealousy:** 'tis the **green-eyed monster** which doth mock the meat it feeds on."
(Iago, Act 3 Scene 3)

"I am not what I am."
(Iago, Act 1 Scene 1)

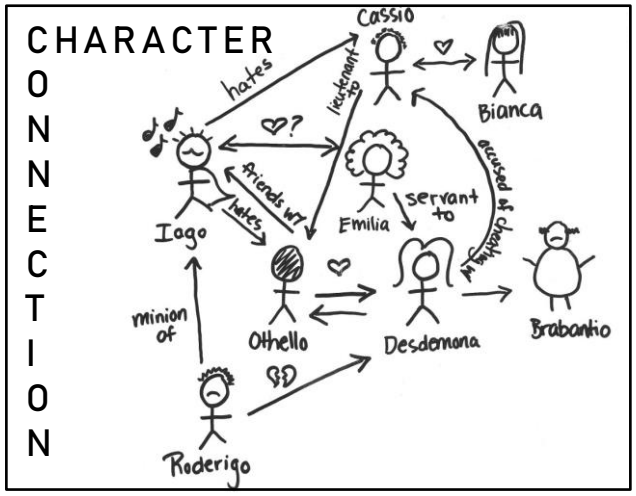
"I follow him to **serve my turn upon him"**
(Iago, Act 1 Scene 1)

"O, now, for ever
Farewell the tranquil mind;
farewell content."
(Othello, Act 3 Scene 3)

"Tis not a year or two shows us a man: **they are all but stomachs, and we all but food:** they eat us hungerly, and when they are full they belch us."
(Emilia, Act 3 Scene 4)

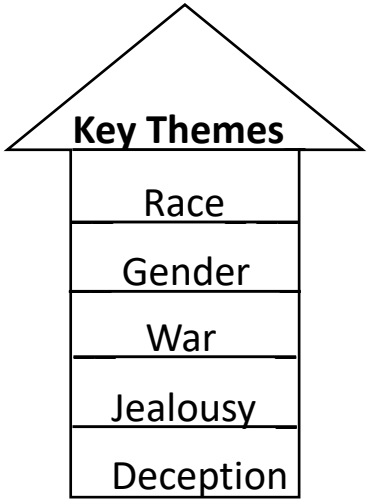
"Heaven truly knows that thou art **false** as **hell."**
(Othello, Act 4, Scene 2)

Versatile Vocabulary: Year 9				
Fighting against the foundations of society: fighting against rules, stories, and patterns				
Module 1: Othello	Someone who is *duplicitous* lies and is two-faced.	duplicitous	credulous	If you describe someone as *credulous*, they are too ready to believe what people tell them and are gullible.
	A *malevolent* person deliberately tries to cause harm or evil.	malevolent	benevolent	If you describe a person in authority as *benevolent*, they are kind and fair.
	If you are *impervious* to someone's actions, you are not changed by them.	impervious to	affected by	If you are *affected* by someone's actions, you are changed by them.
	If you *dehumanise* someone, you treat them as less than human.	dehumanise	defer to	If you *defer* to someone, you follow them because you respect them or their authority.
	If you *stabilise* someone or something, you make it stable.	stabilise	destabilise	If you *destabilise* something, you make it unstable.



Year 9: English

THE BIG FOUR	BIOS
Othello	A general in the defence forces of the city state of Venice. Also, a Moor (from Arabic of African descent). His profession brings him high status in Venice, but his foreign origins and colour separate him from those with whom he lives and works. He has a reputation for courage and good judgment in military matters, but his jealousy and insecurity become fatal flaws in his personal life.
Iago	Othello's 'ancient' (captain) in the Venetian defence forces. He had hoped for promotion, but Othello favoured Cassio over him. Iago is charismatic and likeable man, capable of humour but also unbelievable malevolent darkness. A master of manipulation, Iago is the puppeteer who pulls the strings of the play in a bloody and tragic direction.
Desdemona	A noble Venetian lady, daughter of Brabantio, who falls in love with and marries Othello. She organises her life intelligently and shows courage, love, and loyalty in following her husband into danger. Desdemona shows real bravery, strength and idealism throughout the play but is inevitably another victim of tragic violence.
Cassio	Cassio Othello's lieutenant in the Venetian defence forces. Cassio accompanied Othello as his friend when he was courting Desdemona. He is popular, he speaks well, and he is lively and trusting. Iago eventually convinces Othello that Cassio is Desdemona's paramour (lover). Cassio is appointed governor of Cyprus after Othello's death.



QR Corner!

1. Open phone camera
2. Point at the QR code
3. More Othello!

SCAN ME

Othello Interactive Site (Website)

Year 9 Food Technology

In this project you will learn to use **The practical activities which involve food preparation and cooking will give student an insight into the role of different types of chefs. For example, within the kitchen brigade, they are the executive head chef, sous chef, chefs de partie, commis chef , butcher, vegetable chef, fry chef, cold food and pantry chef, grill chef, pastry chef, fish chef, roast chef and sauté chef. Some of the job roles (e.g. executive chef and sous chef) are suited for the higher attainers in the subject and these student will be given leadership responsibilities. These skills required by chefs will be developed by students following recipes to make dishes using a variety of commodities. These activities will be supported by teacher demonstrations and video clips.**

Weighing and measuring are skills needed by food scientist and chefs and are practised during the mise en place stage of cooking. This is facilitated by teacher demonstrations and students following recipes. The investigative work done on the impact of cooking methods on nutritional value also links to the job role of a food scientists.

By studying about nutrients and healthy eating using the Eat well guide as a framework, students are to the role of a dietitian and a nutritionists. These lessons will be delivered through home learning, group work activities, power points presentations and a visiting speaker.

Researching where our food comes from give students the opportunity to hone the skills of a food writer, culinary librarian and food journalist. This piece of work will be done through classwork (market place activity and home learning.

Food presentation skills are encouraged by adding a finishing technique to dishes made. This is within the remit of a food stylist, food photographer, food artist as well as a molecular gastronomist.

Students practise being a health and safety officer when conducting risk assessment of the food room before their practical tasks. Through role play, students will study the role of an Environmental Health Officer. Linked to these two careers, is the unit of work on health and safety and bacteria and food poisoning .

Conducting sensory analysis gives students insights into the job of a food taster and a quality assurer. This activity is conducted after practical activities in class as well as at home.

Careers in the hospitality industry include managers, administrators, front house staff as well as back house staff. These careers are studied at KS4 through power point presentations, trips, role plays, independent work and home learning activities.

Key Vocabulary

Equipment	Food Safety
Knife	Use by date
Table spoon	Best before date
Butter Knife	Frozen Food
Measuring Jug	Chilled Food
Chopping Board	High risk foods
Saucepan	Low risk foods
Mixing Bowl	Salmonella
Wooden Spoon	E Coli
Frying pan/Wok	Vitamins & Minerals
Food Mixer	Carbohydrates
Baking tray	Gluten in
Rolling Pin	Gluten

Key Skills & Knowledge

By the end of the project you should have gained the skills and knowledge to be able to do the following:

Nutritional needs of different groups of people including Special diets
Nutritional analysis
British and international cuisine
Practical activities – making food dishes
Food presentation techniques

Influential Chefs

Gordon Ramsey, Jamie Oliver

Travel and Tourism

1	le bord de la mer	seaside	18	l'autobus [m]	bus
2	l'île [f]	island	19	l'avion [m]	plane
3	l'excursion/la visite	visit	20	le bateau	boat
4	à l'étranger	abroad	21	le car	coach
5	visiter	to visit	22	la voiture	car
6	rester/loger	to stay	23	la moto	motor bike
7	logement	accommodation	24	la campagne	the countryside
8	l'auberge de jeunesse	youth hostel	25	la montagne	mountain
9	l'hôtel	hotel	26	la plage	beach
10	louer	To hire	27	le sable	sand
11	voler	to fly	28	la rivière	river
12	nager	to swim	29	le lac	lake
13	passer	to spend	30	le monde	world
14	voyager	to travel	31	en plein air	in the open air
15	la location de voitures	car rental	32	l'Afrique [f]	Africa
16	le parking	car park	33	l'Algérie [f]	Algeria
17	à pied	by foot	34	l'Allemagne [f]	Germany

Year 9 French Term 1

Travel and Tourism

35	l'Angleterre [f]	England	52	Je vais	I go
36	la Belgique	Belgium	53	Tu vas	You go
37	Le Bénin	Benin	54	Il/elle va	He/she goes
38	l'Ecosse [f]	Scotland	55	Nous allons	We go
39	l'Espagne [f]	Spain	56	Vous allez	You go
40	les Etats-Unis [m]	USA	57	Ils/elles vont	They go
41	le Maroc	Morocco	58	un pays	a country
42	le Pays de Galles	Wales	59	en	in/to (fem. countries)
43	la Suisse	Switzerland	60	au	in/to (masc. countries)
44	la Tunisie	Tunisia	61	à	in/to (cities/towns)
45	le Sénégal	Senegal	62	aux	in/to (plural countries)
46	reposant(e)	relaxing	63	Je suis allé(e)	I went
47	passionnant(e)	exciting	64	Tu es allé(e)	you went
48	cher	Expensive	65	Il/elle est allé(e)	he/she went
49	pratique	Practical	66	Nous sommes allé(e)s	we went
50	impressionnant(e)	impressive	67	vous êtes allé(e)s	you (plural) went
51	formidable	great	68	Ils/elles sont allé(e)s	They went

Year 9 Autumn 1

KS3 Geography Knowledge: Interconnectedness

Lesson 1: What is Interconnectedness

Interconnectedness

Interconnectedness means places and the people and organisations are interconnected with other places in a variety of ways.

Example of my interconnectedness

- The foods I eat are from different countries around the world. For example, rice is a staple of most peoples diet in the UK, yet it is not grown in the UK.
- The music we listen to is influenced from different countries and people, listening to this means I am interconnected with others
- The clothing that I wear is made in countries outside of the UK, for example in Asian countries such as Pakistan.

Example of interconnectedness that I have studied

- **(Y7)Natural hazards** – when the 2010 Haiti earthquake happened, they received aid and assistance from countries across the globe such as the USA and the UK.
- (Y8) Climate Change – the impacts of climate change affect not just the countries that produce the most greenhouse gas emissions but many other countries around the world. The actions of one country can impact another showing how interconnected they are.

Lesson 2 : Afghanistan Introduction

Afghanistan key facts

- Afghanistan is located in Southern Asia.
- It is a landlocked country, surrounded by 6 other countries.
- Its capital city is Kabul, which is located in the east central part of the country
- It has a population of 38 million people, and the more densely populated areas are in the east of the country
- Afghanistan has a mountainous landscape with some flatter land in the north and south west
- Whist it does have regional variations: Afghanistan's climate sees hot summers and extremely cold winters which are typical in a semiarid climate

Why is Afghanistan under-developed?

Afghanistan's Development

Development Indicator	Afghanistan
GDP per capita	$2,065
Life expectancy	53.25 (52M / 55F)
Infant mortality	106.75 deaths
Literacy Rate	43%
HDI	0.511 Rank: 169

There are a number of factors that have contributed to Afghanistan's poor level of development.

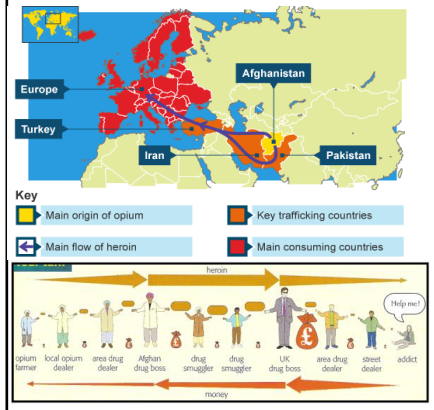
1. Afghanistan is a landlocked country which means it does not have a coastline which makes it harder to trade with other countries and make more money.
2. The land in Afghanistan is very mountainous and therefore hard to develop on. It has poor infrastructure such as roads, railways etc. It also has poor irrigation infrastructure.
3. Afghanistan has also had a long history of conflict which had a huge impact on development.. More specifically, conflicts are costly, so there is less money going towards making improvements in healthcare and education.
4. Conflict has impacted on trade between Afghanistan and its neighbouring countries and has also left Afghanistan to be seen as a country that is not stable, there are less opportunities for foreign investment, therefore less job opportunities and income.
5. Finally, Afghanistan is prone to a number of natural disasters such as earthquakes, floods, droughts, landslides. Money goes towards responding to these instead of developing different aspects of the country.

Lesson 3: Afghanistan Opium Poppy Flow

Opium Poppy

- An opium poppy is a flowering plant where the sap is used to make heroin.
- Heroin is a drug that devastates many people.
- Around 80-90% of the world's heroin comes from Afghanistan.
- Many Afghan farmers have very few options to earn a living so grow opium poppies approx. 3 million farmers
- There is little to no irrigation infrastructure so it is very difficult to grow anything.
- There is a very limited amount of factories in the country as a result there are less well paying jobs
- The climatic conditions mean they can often face drought and but the opium poppy flower can withstand these conditions.

Poppy Flow to the UK



- Due to globalisation trade across the world has increased and become easier. Even the trading of goods such as drugs.
- Europe is an important market for Afghanistan's opium poppy production and especially countries such as the UK, France and Germany. Look at the countries in red on the map opposite.
- But to get there it must travel through many other countries first.
- The 'Balkan route' is the route that is predominantly taken for the trading of heroin.
- Firstly heroin is trafficked through Iran, then it is trafficked through Turkey. Once it is here it is trafficked through the remainder of Europe.
- There are many people involved in the drug trade along this route. This includes farmers, dealers, smugglers, and addicts, all interconnected to each other as a result of Afghanistan.

Lesson 4 and 5: Iceland Introduction and Impacts

Iceland key facts

- Iceland is located in the North Atlantic Ocean, between Europe and North America, specifically Northern Europe.
- Capital city = Reykjavik, located in southwestern Iceland. Iceland is the 2nd largest island in Europe.
- The terrain in Iceland is mainly plateau but has some mountain peaks.
- Population = 350,000 people
- Located on a constructive plate boundary. North American plate and the Eurasian plate are moving away from each other on the Mid-Atlantic Ridge = new land is created
- Eyjafjallajökull is a volcano located in the south of the island – Eyja (island) Fjalla (mountain) Jokull (glacier)

Eyjafjallajökull Eruption 2010

- On the 14th of April 2010, an eruption occurred 250m below a glacier (ice sheet)
- This melted the ice on top of the volcano causing a glacial flood (a Jökulhlaup)
- Ash was ejected high into the atmosphere (ash plume) , almost 10km high
- The volcano continued to erupt and spew ash into the atmosphere.

Local Impacts

1. The local population of 800 people were evacuated due to the threats of the ash
2. Agricultural land was damaged due to falling ash
3. Local flooding due to the glacier melting.
4. Fish exports from Iceland were disrupted - a major local industry.

Global Impacts

1. European air space was closed = air space was at a standstill costing billions of Euro's
2. Sporting events = cancelled or postponed e.g. 2010 Japanese motorcycle grand prix.
3. Many Farmers in Kenya were affected as flowers and vegetables were left to rot losing up to $1.3m per day.
4. Barack Obama and other world leaders could not get to Poland to a state funeral
5. The prime Minister of Norway had to run Norway from NYC as he could not return.
6. More media attention for Iceland = mor tourists

KS3 Geography Knowledge: Interconnectedness

Lesson 6: International Migration

Migration Key Terms

- **Migration** – movement of people
- **Migrant** – someone who moves
- **Internal (domestic) migration** – within a country
- **International migration** – between countries
- **Emigrant** – someone moving out of an area
- **Immigrant** – someone moving into an area
- **Voluntary migrants** choose to move, eg. to start a new career
- **Forced migrants (refugees)** have no choice, move due to war or natural disasters, eg. Syrian war refugees.

The largest migrant population live in the United States (>40 million).

- **The main international migration routes:**
- South America → Mexico → USA
- West Africa → Spain → France → UK
- East Africa → Italy → UK
- Middle East → Europe
- The largest migrant proportion of the total population: in UEA, Saudi Arabia and Australia.

Push factors - reasons that people want to leave a place eg. *political fears, lack of jobs, natural disasters, wars, shortage of food.*

Pull factors - **reasons** that attract people to a new place, eg. *job opportunities, education opportunities, better housing, medical care, family links.*

All push and pull factors can be categorised into: social, economic, environmental and political.

Barriers or obstacles to migration:

- physical distance and cost of journey
- physical barriers (oceans, mountain ranges)
- political obstacles (international borders, immigration restriction)
- cultural barriers (different language and way of life).

Examples of past migration to the UK

- 1800's - Irish people fleeing from famine and poverty and Jews escaping persecution
- 1930's – Jews fleeing from Nazi's
- 1948 – Caribbean immigrants
- 1950-1970's – Indians, Pakistanis and Bangladeshis were looking for work
- 1972 – African-Asians were removed from Uganda by the government
- 2004 – Many migrant from the EU came to live and work in the UK
- 2016 – Since 'Brexit' there are fewer EU citizens travelling to the UK

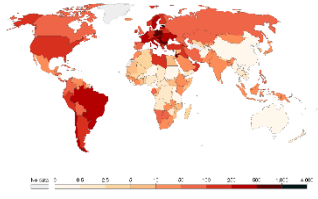
Migrants Impacts on Places

- Diversity in the UK is celebrated with music, food, colourful parades, e.g. annual Notting Hill Carnival in London celebrates Caribbean culture brought to the UK by West Indian immigrants after Second World War. Today it attracts people from all backgrounds who ant to join Europe's biggest street party.
- Migrants may change the places they migrate to. Evidence for this change can be found in our local area. The impacts of migration on our local area may change over time. For example on your high street you may find examples of restaurants from India, China, Turkey or Nigeria, Polish or Romanian delicatessen, Muslim mosques, Hindu temples and Catholic churches. Small businesses are frequently run by immigrants too.

Lesson 8: Covid Spread

Afghanistan key facts

- Coronavirus disease is an infectious disease caused by a newly discovered coronavirus.
- COVID-19 = Coronavirus 2019.
- Globalisation is the interaction and integration among people, companies & governments worldwide. For example, steam ships used to be 36mph and now planes are 500-700mph. COVID-19 has travelled worldwide due to contaminated people using transport.
- COVID-19 can also travel easily when a country is densely populated.
- This means that there are more people in an area for the virus to be passed through the air. The percentage of a country isn't always an accurate indication of the severity of COVID-19. This is because some countries are more populated than others. For example, in May 2019 22 million people in India had tested for positive for COVID-19, however this was only 1.59% of the population, whereas the UK had 6.6% positive with only 4 million cases.



Lesson 8 & 9: Covid-19 Spread and Impacts

Types of employment:

The four different job sectors:

- Primary – People work with raw materials, for example, fishing, mining, farming
- Secondary – Manufacturing, turning raw materials into something else (factories)
- Tertiary – Providing service and skills – for example, teachers, construction, lawyers
- Quaternary – Jobs in research and development, for example, pharmaceuticals and IT

Impacts of Covid-19

1. Pick for Britain (UK government campaign) to encourage people (70,000 workers) to apply to help out in the farming business.
2. Many foreign seasonal workers were unable to travel to the UK during COVID-19 (travel regulations).
3. Globally, maize prices raised by 80% and wheat prices 28% higher in 2021 since January 2020.
4. Shops were closed globally (UK lockdown) and shoppers were encouraged to only leave the house for essential reasons. Lots of unemployment of tertiary workers (hospitality & retail).
5. Amazon gained global record profits in July 2020 and continues to do so through 2021. Amazon's total sales surged 26% to £13.73bilion. They also increased the workforce by 34% during 2020/21, which created many economic opportunities in the manufacturing sectors.
6. Governments around the world have pledged billions of dollars for a Covid-19 vaccine and treatment options.
7. By May2021, the UK had already spent £12 billion on COVID-19 vaccinations.
8. In the UK, car annual sales have slumped by 29% to less than two million, the biggest year-on-year fall since the Second World War. During the first full month of lockdown, car sales fell by 97%.

Lesson 10: Interconnectedness and the Future

The future?

- Throughout this unit we have looked at many examples of how we are interconnected with countries and places around the world.
- But will that change in the future?
- There are different things that are happening around the world that mean we are more connected with some places and less connected with others.

Will we be more or less interconnected?

THE UK NO LONGER PAR TOF THE EU:

- The UK has left the EU (Brexit)
- As part of the EU a group of 27 = freedom to live and work in EU countries
- Free trade with other EU countries
- Brexit = no longer able freely able to do these.
- Links within EU may be harder to maintain.

THE RISE OF TECHNOLOGY AND SOCIAL MEDIA:

- Technology has increased our ability to communicate with other countries and places.
- Covid-19 pandemic saw an increase in how we use technology and extended links.
- Social media (Instagram, twitter, tiktok) = played a role in making us more interconnected. with people all over the world that otherwise we would not be able to do.

UK FOOD IMPORTS:

- The UK imports over 40% of its food = EU, Africa, North America. (fruit, vegetables, meat)
- UK relies on may other countries to ensure that we can feed our population.
- The ONS (office for national statistics) estimated = additional 7.5 million people in the UK by 2050 = a larger demand on food.

FIGHT AGAINST CLIMATE CHANGE:

- Climate change is a global problem = most of the counties around the world are contributing to.
- impacts will not be distributed fairly. The lowest contributors to CC (LICs) will feel the largest impacts.
- Climate change needs countries of the world to work together with the aim of reducing the GHG emissions
- International agreements E.G. Kyoto Protocol in 1997 and 2015 Paris Agreement.

YEAR: 9 SUBJECT: History

Medieval: c.1000 - c.1500

New Definitions of Crime
- The Kings and nobility decided on crimes.
- **Crime against the person**: murder, fights.
- **Crime against property**: poaching, arson.
- **Crime against authority**: treason, attack on a person of a higher status.

Methods of Law Enforcement
- **Responsibility of King** to maintain King's Peace.
- **Local Collective Responsibility**: Hue and Cry, Tithings, Hundreds, Shire Reeves,
- **Role of the Church**: Religious oaths, trail by hot water, hot poker, cold water, blessed bread to decide guilt or innocence

Punishments
- **Public punishments:** Stocks and pillory
- **Fines:** Wirgild
- **Capital Punishment:** Hanging
- **Corporal Punishment:** Branding, maiming

New Definitions of Crime
- **William the Conquer** asserts his control
- **Deals violently** with Anglo-Saxon Rebels
- **Builds Castles**
- **Feudal System**
- **Forest Laws & poaching & outlaws**
- **Murdrum Fine**

Methods of Law Enforcement
- **Collective Responsibility** still ongoing.
- **The King's Mund** (The King's Peace)
- ***NEW* Trial by Combat** for nobility.

Punishments
- Similar punishments to Anglo-Saxon **BUT**
- ***NEW* Wergild** Fine paid to the King
- More brutal punishments
- Community punishments
- Increased use of death penalty to show authority as King.

Definitions of Crime
- The Kings highly influenced by nobles when deciding new laws to protect their own interests against the poor.
- ***NEW LAW* Statute of Labourers 1351**
- ***NEW LAW* Heresy 1382**

Methods of Law Enforcement
- Collective Responsibility ongoing
- ***NEW* Henry II Assizes of Clarenden** – set of rules and a jury for law courts.
- Prisons to hold suspects before trial.
- Royal Judges and Justices of Eyre visit every county twice a year.
- **Standardised** written instructions given to Shire Reeves.
- ***NEW* Coroners and Justices of Peace.**

Punishments
- Corporal punishment as deterrent
- ***NEW* Hanged, drawn, quartered** for the crime of treason.

The Influence of the Church
- **A huge influence of the Church over attitudes and law & order.**
- **Church Courts more lenient on punishments.**
- **The Pope ends Trial by Ordeal to encourage law courts & juries.**
- **Henry II challenged the Church's power – dislike of Benefit of the Clergy and seeking religious sanctuary.**

Early Modern: c.1500 - c.1700

New Definitions of Crime
MANY RELIGIOUS INFLUENCES IN THIS TIME
- ***NEW* Heresy and Treason** – think changes in religion (Catholic Vs Protestants).
- ***NEW* Vagabondage/vagrancy Laws:**
- The Vagrancy Act
- Relief of the Poor Act
- The Poor Law
- ***NEW* Smuggling**
- ***NEW LAW* 1671 Game Act** (poaching still a social crime)
- ***NEW* Puritan Laws 1653** – Strict Puritan laws after the Civil War
- ***NEW* Witchcraft**

Main causes of change
- ❑Religion
- ❑Politics
- ❑Changing attitudes
- ❑Role of monarchs
- ❑Growing towns
- ❑Population
- ❑Exploration
- ❑Trade/Economy

KEY INDIVIDUAL: Matthew Hopkins & Witchcraft
- ❑Why did so many believe in witchcraft?
- ❑What were the laws against it?
- ❑How were individuals put on trial?
- ❑What was the punishment?
- ❑What was the role of Matthew Hopkins as a key individual?

KEY EVENT: The Gunpowder Plot 1605
- ❑ An example of religious and political influences.
- ❑ An example of harsh Bloody Code punishments
- ❑ An example of how laws change as a result of crime: 1605 **Thanksgiving Act**, 1606 **Popish Recusants Act**

CHANGE – Methods of Law Enforcement
- ***NEW* The wide use of Town Constables**
- *NEW* The Night Watchman
- *NEW* Thief Taker

SIMILARITY
- ❑**Collective Responsibility** still effective in smaller towns and villages. Hue and Cry etc.
- ❑Still **no national form of organised** policing
- ❑**Standards** of law enforcement varied across the country.
- ❑**Rich** better protected than the poor.

CHANGE – Punishments
- ❑***NEW* Transportation** to North America.
- ❑***NEW* Early prisons** as a form of punishment.
- ❑***NEW* Houses of Correction** and hard labour.
- ❑***NEW*** The start in the belief of the **BLOODY CODE**.

SIMILARITY
- ❑**Corporal punishments** remain
- ❑Punishments as a **deterrent** and **retribution** remain.
- ❑**Positive attitudes** to harsh punishments.

Industrial Revolution: c.1700 - c.1900

New Definitions of Crime
SIMILARITY
- **SMUGGLING:** Still a social crime, still hard to tackle, declined as import duty reduced.
- **POACHING**: Still a social crime by the poor, not often reported, enforced by the rich.
- **HIGHWAY ROBBERY**: A very minor crime in previous era.
- **WITCHCRAFT**: Still some poorer, rural belief in witchcraft.

CHANGE
- **SMUGGLING:** Increased, gangs, punished harshly, rich supported it for luxury goods.
- **POACHING**: Increased, gangs, harsher punishments, 1723 Black Act..
- **HIGHWAY ROBBERY**: Dramatic increase with use of transport and trade.
- **WITCHCRAFT**: Was decriminalised in 1735. Most educated attitudes no longer believed in witchcraft.

Main causes of change
- ❑Decline in religious beliefs
- ❑Politics, population increase, voting.
- ❑Exploration, economy of the Industrial Revolution.
- ❑Improved transport & trade.
- ❑Changing attitudes, humanitarianism, & education.

KEY INDIVIDUAL: Home Secretary & Prime Minister Robert Peel.
- ❑Major changes to Prison Reform and police. Known as the 'Father of Modern Policing'.
- ❑1823 Gaols Act, 1829 Metropolitan Police Act

KEY EXAMPLE: Pentonville & the Separate System
- ❑Prison first of its kind.
- ❑Emphasised hard work & isolated prisoners
- ❑Split prisoners into different groups.
- ❑However, health was taken into account through sanitation.
- ❑**KEY TERMS:** The Crank, treadwheel, discipline, separate system, silent system, religion, cells, religious teaching, toilets, deterrent, reform.

Methods of Law Enforcement
CHANGE
- ***NEW* 1748 Bow Street Runners**
- ***NEW* 1829 First police force by Robert Peel and Metropolitan Police Act**
- *NEW* Rural Constabulary Act
- *NEW* 1842 Start of the C.I.D.
- *NEW* 1856 Police Act – National Force.

SAME
- ❑**Rural areas** still dealt with crime
- ❑**Parish Constables** dealt with local crime
- ❑**Watchmen** still employed by the rich.
- ❑**Soldiers/army** could still be brought in.
- ❑**Collective Responsibility** still expected.

Punishments
MUCH CHANGE
- ***NEW* Humanitarianism & prison reform**
- ***NEW* Elizabeth Fry and John Howard.**
- ***NEW* Bloody Code ended.**
- ***NEW* Laws to improve prisons.**
- ***NEW* Religion influenced prison changes.**
- ***NEW* Robert Peel influenced change.**
- ***NEW* Technology improved prison health**
- ***NEW* Emphasis on reform & rehabilitation**

Transportation & capital punishment ended in 1869.

20th Century: c.1900-Present

New Definitions of Crime
SIMILARITY & DIFFERENCE
- ***NEW * methods of crime but same act.**
- ❑**Driving Offences:** speeding, drink driving.
- ❑**Drug Taking and dealing (social crime)**
- ❑**Cyber Crimes:** fraud, theft, copyright.
- ❑**Slavery: people trafficking.**
- ❑**Terrorism:** Remember 1605?
- ❑**Smuggling:** Advanced gangs & methods.
- ***NEW* Crimes due to changing attitudes.**
- ❑**Homophobic crime** – homosexuality decriminalised & Sexual Offences Act 1967.
- ❑**Race/hate crime:** Race Relations Act 1968.
- ❑**Dom. Violence** Domestic Violence Act 1976
- ❑**Abortion:** Decriminalised in 1967.

Main causes of change
- ❑Technology & science
- ❑Public attitudes and democracy
- ❑Politics
- ❑Trade and economy
- ❑Liberal attitude towards reform and rehabilitation.
- ❑Immigration & population.

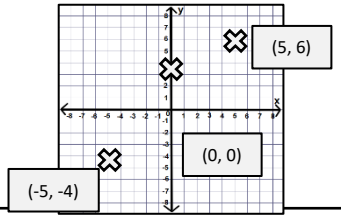
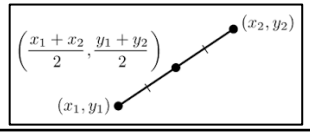
KEY EXAMPLE: The treatment and attitudes towards Conscientious Objectors.
The Military Services Act 1916
- ❑ Reasons for not joining the army and becoming a C.O. or 'Conchie'.
- ❑ Attitudes of the **media** towards C.O.s in WW1
- ❑ Attitude of the **government** towards C.O.s in WW1
- ❑ Attitude of the **public** towards C.O.s in WW1
- ❑ Punishment of the C.O.s in WW1
- ❑ How attitudes stayed the same and changed by WW2.

CHANGE – Methods of Law Enforcement
- ***NEW* A range of technological and scientific developments to help law enforcement.**
- ***NEW* An emphasis on crime prevention, targeting youth & education.**
- ***NEW* Specialist police units** to target specific groups – Special Branch, Fraud Squad, Dog Unit.**
- ***NEW* A standardised set of rules for policing the whole country and police training.**

SAME
Neighbourhood Watch a form of Collective Responsibility.
A re-introduction of police '**on the beat**' with the use of Community Support Officers.

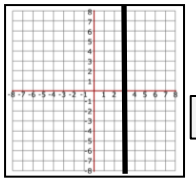
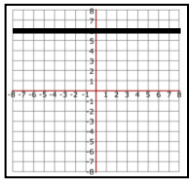
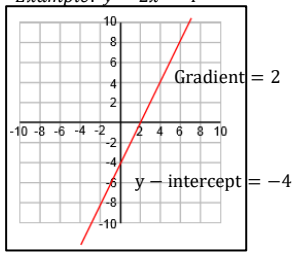
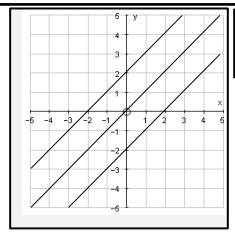
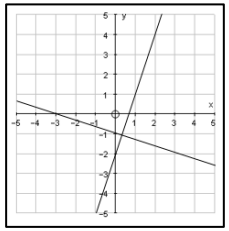
Punishments
CHANGE
- ❑**Abolition of the Death Penalty 1969** – Know the reasons why.
- ❑**Further Prison Reforms:** Borstals, Education, Criminal Justice Act 1948, Increase in prison numbers, Mental hospitals,
- ❑**Non-Custodial Sentences:** Youth Detention Centre, probation, parole, community service, electronic tagging, ASBO, treatment programmes, restorative justice, fines.
- ❑**Hard Labour abolished.**

Year 9 Maths - Autumn 1

Unit 1 - coordinates			
No.	**Question**	**Answer**	**Example**
1.1	Coordinates are always	(x, y) "along the corridor and up the stairs"	
1.2	Midpoint of a line	$(\frac{x_1+x_2}{2}, \frac{y+y_2}{2})$	

Unit 3 - proportion			
No.	**Question**	**Answer**	**Example**
3.1	Direct proportion	As one variable increases, the other variable increases	
3.2	Indirect proportion	As one variable increases, the other variable decreases	
3.3	The unitary method	Find one first	

Unit 4 – standard form			
No.	**Question**	**Answer**	**Example**
4.1	Standard form	A way of writing very big or very small numbers using powers of 10	4,000,000 is 4 x 10^6
4.2	10^{-3}	0.001	
4.3	10^{-2}	0.01	
4.4	10^{-1}	0.1	
4.5	10^{0}	1	
4.6	10^{1}	10	
4.7	10^{2}	100	
4.8	10^{3}	1000	

Unit 2 – y = mx + c			
No.	**Question**	**Answer**	**Example**
2.1	Vertical lines are always	x = … where all the x coordinates are the same	
2.2	Horizontal lines are always	y = … where all the y coordinates are the same	
2.3	m	Gradient	*Example:* $y = 2x - 4$ 
2.4	To find the gradient	"rise over run" $\frac{Difference\ in\ y}{Difference\ in\ x} = \frac{y_2 - y_1}{x_2 - x_1}$	
2.5	c	Y intercept	
2.6	To find the y–intercept	The y coordinate when x = 0 This is where the line crosses the y axis	
2.7	Parallel lines	Have the same gradient	
2.8	Perpendicular lines	$-\frac{1}{gradient}$	

Composing using a stimulus

STRUCTURE - the different sections of a piece or music and how they are ordered.

Typical Pop Song Structure

Intro – Verse 1 – Verse 2 – Chorus – Verse 3 – Middle 8/Bridge – Verse 4 – Chorus – Outro

Intro

The introduction sets the mood of a song. It is often instrumental but can occasionally start with lyrics.

Verses

Verses introduce the song theme. There are usually new lyrics for each verse which helps to develop the song's narrative

Choruses

All the choruses usually have the same lyrics. This section relays the main message of the song.

Middle 8/Bridge

This section adds some contrast to the verses and choruses by using a different melody and chord progression.

Binary Form

Music that has two sections. These are labelled A and B.

A B

Ternary Form

Music that has three sections. The A section is heard again after B.

A B A

Rondo Form

A recurring theme (A) contrasted by different sections.

A B A C A D A E

Theme & Variation

A composition can be developed using the **VARIATION** technique.
A main theme is composed then the following sections vary this theme in some way, by altering for example:

MELODY – RHYTHMS – CHORDS – TEMPO – INSTRUMENTATION – KEY

Instrumental Solo

Solos are designed to show off an instrumentalists skills.
Rock, jazz and blues often feature solos on instruments such as piano, sax, guitar and drums

Strophic Form

When all of the verses are sung to the same music.

Through Composed

When each section has different music. No section is repeated.

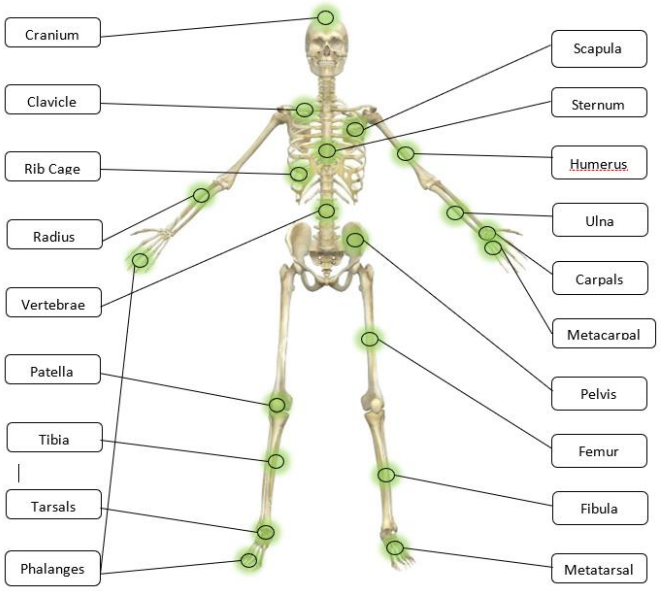
1.1a – The Structure and Function of the Skeletal System

Component	% of overall GCSE (9-1) in Physical Education (J587)			
	AO1	AO2	AO3	AO4
1: Physical factors affecting performance	12.5	10	7.5	0

Assessment Objectives	
AO1	Demonstrate knowledge and understanding of the factors that underpin performance and involvement in physical activity and sport.
AO2	Apply knowledge and understanding of the factors that underpin performance and involvement in physical activity and sport.
AO3	Analyse and evaluate the factors that underpin performance and involvement in physical education and sport.

1.1a – The Structure and Function of the Skeletal System

The Skeletal Structure



The Skeletal Functions

1. **Support –** the skeleton keeps the body upright and provides a framework for muscle and tissue attachment.
2. Posture – the skeleton gives the correct shape to our body.
3. **Protection –** the bones of the skeleton protect the internal organs and reduce the risk of injury on impact. For example, the cranium protects the brain, the ribs offer protection to the heart and lungs, the vertebrae protect the spinal cord and the pelvis offers protection to the sensitive reproductive organs.
4. **Movement –** the skeleton allows movement of the body as a whole and its individual parts. The bones form joints and act as levers, allowing muscles to pull on them to produce movement. The bones of the skeleton provide surfaces for the attachment of muscles.
5. **Blood cell production –** certain bones in the skeleton contain bone marrow which produces red blood cells, white blood cells and platelets. Examples of bones that contain marrow are the pelvis, sternum, humerus and femur.
6. **Storage of minerals -** the bones store minerals such as calcium, iron, potassium and phosphorous and release them into the blood when the body needs to use them.

1.1a – The Structure and Function of the Skeletal System

Synovial Joint Structure (Freely Moveable Joints)

Synovial joints (freely movable joints):

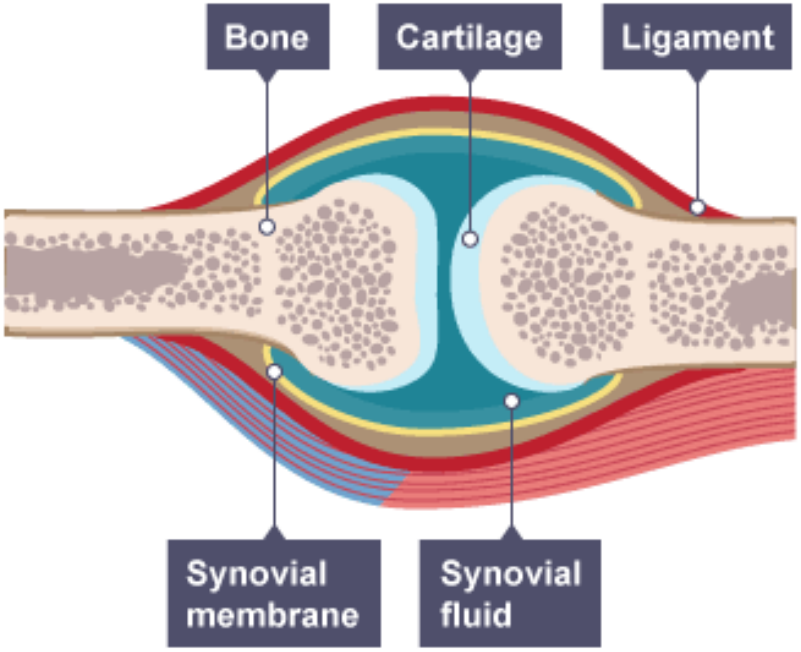
- Enable the free movement to perform skills and techniques during physical activity.
- Have synovial fluid in the joint cavity that lubricates or 'oils' the joint, so it moves smoothly. Synovial fluid is made by the synovial membrane.
- The ends of the bones are covered with cartilage which cushions the joint and prevents friction and wear and tear between the bone ends. Cartilage is a soft, spongy connective tissue.

Ligaments:

- Connect bone to bone to keep the joint together.
- A connective tissue and are tough, fibrous and slightly elastic.
- Stabilise the joints during movement and prevent dislocation by restricting actions outside the normal joint range.
- Absorb shock because of their elasticity, which protects the joint.
- Help maintain correct posture and movement.

Tendons:

- Connect muscle to bone.
- Are very strong, inelastic connective tissues.
- Allow movement at a synovial joint by attaching the muscles across the joint to pull a bone.

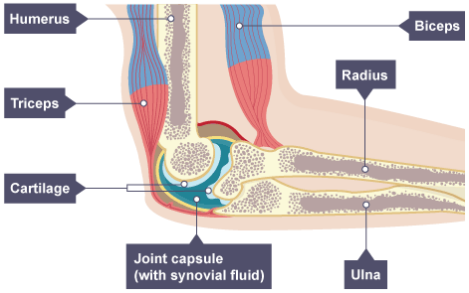


1.1a – The Structure and Function of the Skeletal System

Four Synovial Joint

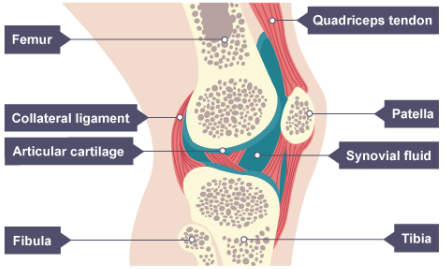
Elbow joint

- Hinge joint.
- Articulating bones are humerus, radius and ulna.
- Allows bending (flexion) and straightening (extension).
- Muscles which move the elbow are biceps and triceps.



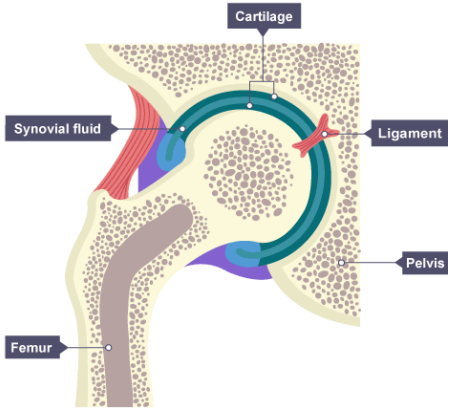
Knee joint

- Hinge joint.
- Articulating bones are femur and tibia (the patella is not classed as part of the joint, nor is the fibula).
- Allows bending (flexion) and straightening (extension).
- Muscles which move the knee are quadriceps and hamstrings.



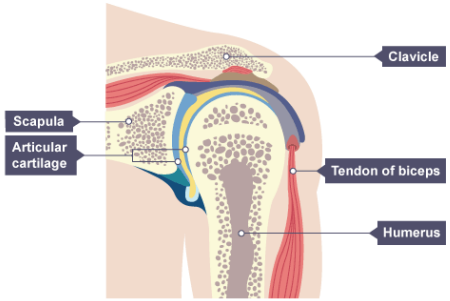
Hip joint

- Ball and socket joint
- Articulating bones are pelvis and femur (head of femur is 'ball' and cup in pelvis is 'socket')
- Allows a large range of movement in all directions
- Many muscles are used to move the hip joint, including the gluteals



Shoulder joint

- Ball and socket joint.
- Articulating bones are humerus and scapula (the clavicle is not part of the shoulder joint).
- Allows a great range of movement in all directions.
- Many muscles are used to move the shoulder joint, including the deltoid, trapezius and latissimus dorsi.



1.1a – The Structure and Function of the Skeletal System

Types of Joint Movement

Flexion: The decrease in the angle around a joint.

Extension: The increase in the angle around a joint.

Abduction: The movement of a limb away from the midline of the body.

Adduction: The movement of a limb towards the midline of the body.

Rotation: The turning of a bone about its longitudinal axis within a joint. (Rotation towards the midline of the body is called medial rotation, while the rotation away from the midline of the body is called lateral rotation).

Circumduction: The combination of flexion, extension, abduction, adduction and rotation – a circular movement of a limb at a joint.

Hinge Joint

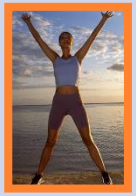
Flexion: The elbow flexes when performing a biceps curl. The knee flexes in preparation for kicking a ball.

Extension: The elbow when throwing a shot put.

Ball and Socket Joint

Flexion: The hip joint occurs when the femur (upper leg) moves forwards, which happens when long jumpers land or at the end of kick in football.

Extension: The shoulder occurs when the humerus moves backwards from the rest of the body, which happens at the end of the pull stroke in front crawl.

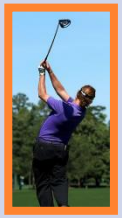


Abduction: The hip and shoulder joints during a jumping jack movement.

Adduction: The hip and shoulder, returning the arms and legs back to their original position from a jumping jack movement.

Circumduction: The shoulder joint during an overarm tennis serve.

Rotation: The hip joint in golf while performing a drive shot.



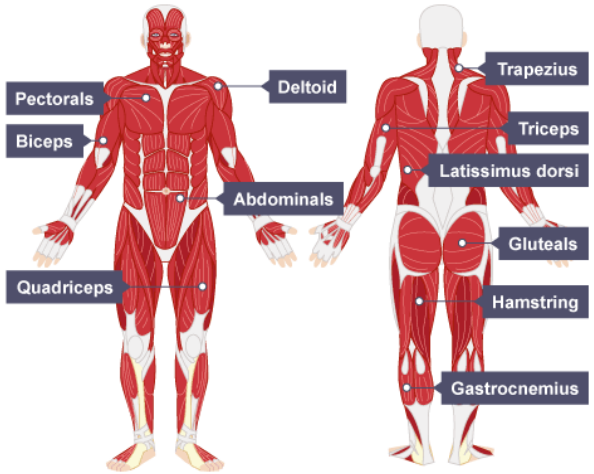
1.1b – The Structure and Function of the Muscular System

Component	% of overall GCSE (9-1) in Physical Education (J587)			
	AO1	AO2	AO3	AO4
1: Physical factors affecting performance	12.5	10	7.5	0

Assessment Objectives	
AO1	Demonstrate knowledge and understanding of the factors that underpin performance and involvement in physical activity and sport.
AO2	Apply knowledge and understanding of the factors that underpin performance and involvement in physical activity and sport.
AO3	Analyse and evaluate the factors that underpin performance and involvement in physical education and sport.

1.1b – The Structure and Function of the Muscular System

The Muscular Structure



Involuntary, Voluntary and Skeletal Muscles

Involuntary muscles are not under our conscious control which means we can't make them contract when we think about it.

Voluntary muscles are under our conscious control so we can move these muscles when we want to. These are the muscle we use to make all the movements needed in physical activity and sport.

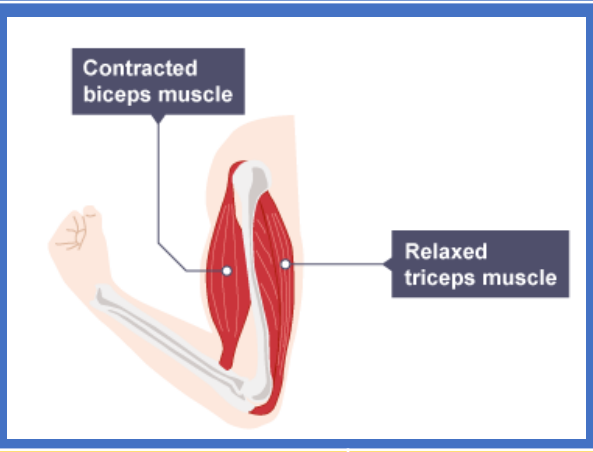
1. Smooth muscle: found in the internal organs and blood vessels (involuntary).
2. Cardiac muscle: found only in the heart (involuntary).
3. Skeletal muscle: attached to the skeleton (voluntary).

Muscle	Function	Example in Sport
Deltoid	Lifting the arm at the shoulder (the deltoid muscle has different parts which flex, extend and abduct the shoulder joint)	Lifting the arms to block in volleyball; upward arm swing when trampolining
Trapezius	Shoulder horizontal extension (moving the arms backwards at shoulder level)	Preparation phase of an overarm throw or badminton smash
Pectorals	Adduction of the shoulder (moving the arm towards the body); Shoulder horizontal flexion (moving the arms forwards in front of the body)	Upwards phase of a press up; rugby player making a tackle
Triceps	Extension of the elbow (straightening the arm)	Shooting and chest passing in netball (execution phase)
Biceps	Flexion of the elbow (bending the arm)	Drawing a bow in archery; 'backscratch' position during tennis serve
Abdominals	Flexion of the spine (sitting upwards)	Performing a sit up or a forward roll
Latissimus dorsi	Adduction of the shoulder (moving the arm down towards the mid-line of the body)	Hitting in hockey – left shoulder during preparation, right shoulder during execution and recovery
Gluteals	Hip extension (moving the femur backwards)	Pulling leg back at the hip before kicking a ball
Quadriceps	Extension of the knee (straightening the leg)	Kicking a ball (execution and recovery phase)
Hamstrings	Flexion of the knee (bending the leg)	Performing a hamstring curl on a weights machine; preparation phase of a rebound jump in basketball
Gastrocnemius	Plantar flexion of the ankle (pointing the toes downwards)	Standing on tiptoe to mark a shot in netball or pointing the toes during a gymnastic or dance move

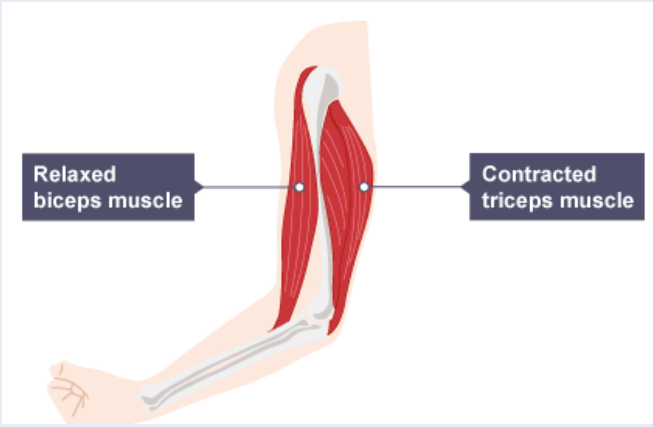
1.1b – The Structure and Function of the Muscular System

Antagonistic Muscle Pairs

Agonist: Contracting muscle that shortens and bulges, pulling on a bone to create movement.



Antagonist: Relaxing muscle that lengthens and thins, controlling the movement through resistance.



Joint	Antagonistic pair	Movements produced	Sport example	Fixator
Elbow	Biceps; triceps	Flexion; extension	Chest pass in netball; badminton smash	Deltoid; Trapezius
Knee	Hamstrings; quadriceps	Flexion; extension	Jumping to block in volleyball; tuck jump in trampolining	Gluteals; Abdominals
Shoulder	Latissimus dorsi; deltoid	Adduction; abduction	Golf swing; breaststroke arms	Trapezius; abdominals
Hip	Gluteals; Hip flexor	Extension; Flexion	Shot in football; Sprinting in athletics	Abdominals

1.1b – The Structure and Function of the Muscular System

Fixators: Support and stabilise

The trapezius muscle can act as a fixator when the biceps is flexing the elbow joint.

The abdominals can act as fixators to stabilise the body for hip and knee movements.

Exam Question: Describe how the antagonistic muscle pairs are working at the elbow during the downwards and upwards phase of a press up.

During the downwards phase, flexion occurs at the elbow. The biceps are the agonist, and they contract, and the triceps are the antagonist relaxing and lengthening to stabilise the movement by adding resistance so the body is lowered under control down towards the floor. During the upwards phase, the triceps are the agonist and contract, shortening and bulging to pull the ulna creating extension at the elbow. The biceps are the antagonist, relaxing and lengthening stabilising the movement

Antagonistic Muscles Pairs in Action

Preparation and execution and recovery phase in football

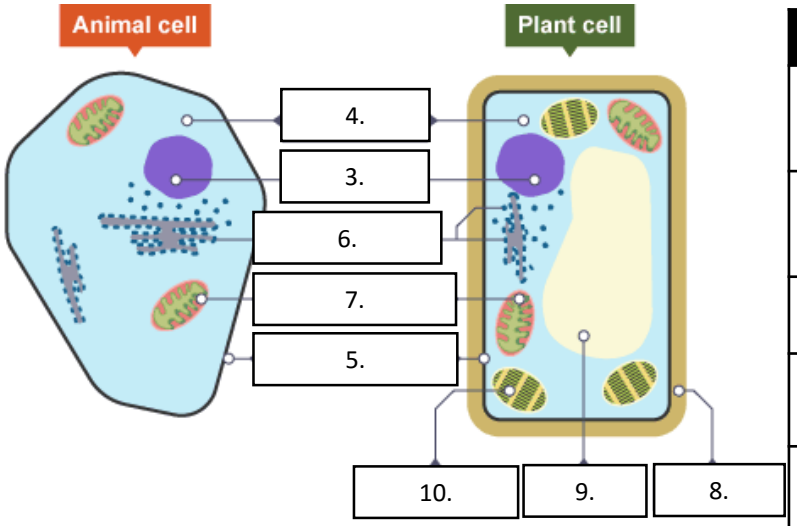
In the preparation phase, when a footballer prepares to kick a football, their hamstrings contract to flex the knee while the quadriceps lengthens to allow the movement. The hamstrings are the agonist and the quadriceps are the antagonist.

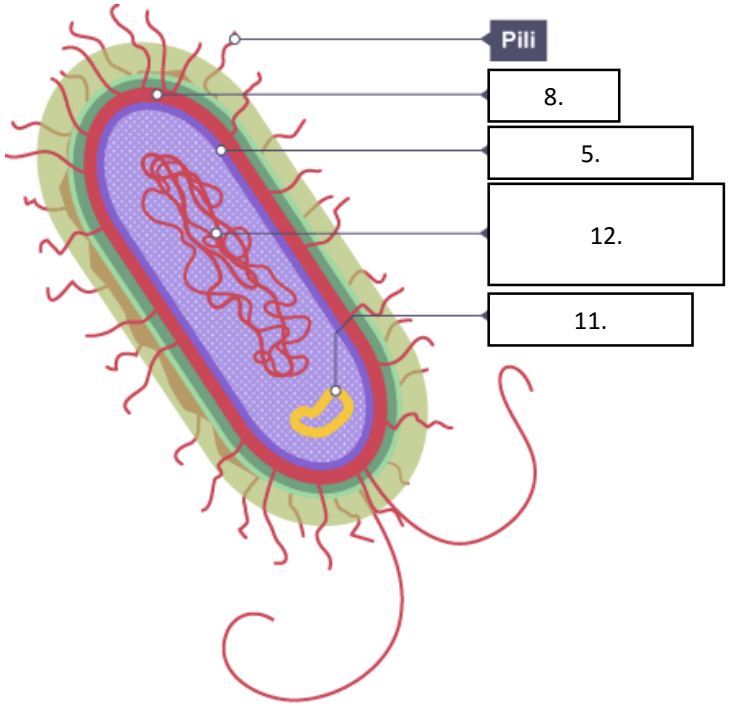
In the contact and recovery phase, the quadriceps contract to extend the knee while the hamstrings lengthen to allow the movement. The quadriceps are the agonist and the hamstrings are now the antagonist.

The abdominals would be acting as fixators.

Biology Topic 1: Cell Biology

1. Cell structure





Keywords	
1. Eukaryotic	A complex cell with a nucleus (e.g. animal or plant cells).
2. Prokaryotic	A smaller cell without a nucleus (e.g. bacterial cell).
3. Nucleus	Contains genetic material.
4. Cytoplasm	Where a cells chemical reactions happen.
5. Cell membrane	Controls what goes into and out of a cell.
6. Ribosome	Part of a cell where proteins are made.
7. Mitochondria	Where aerobic respiration takes place.
8. Cell wall	Only found in plant cells. Made of cellulose and supports the cell.
9. Vacuole	Only found in plant cells. Contains cell sap.
10. Chloroplasts	Only found in plant cells. Where photosynthesis takes place.
11. Plasmid	Only found in bacterial cells. A small loop of DNA.
12. Genetic material	Long strands of genes not tightly pack in a nucleus.

2. Specialised cells

Keywords	
Differentiation	A stem cell turning into a specialised cell
Stem cell	A special type of cell which can turn into other specialised cells
Adult stem cells	Can only produce certain types of cell -found in bone marrow
Embryonic stem cells	Can produce all types of cells - controversial
Meristems	Where plant stem cells are found

Sperm cells	Take male DNA to the egg • Tail to help it swim • Lots of mitochondria for energy
Nerve cells	Carry electrical signals around the body • Long to cover long distances • Branches to connect to other cells
Muscle Cells	Muscle cells contract • Long so have space to contract • Lots of mitochondria for energy
Root hair cells	Root hair cells absorb water and minerals • Long hairs • Big surface area for absorption
Phloem Cells	Phloem cells transport sugars (plants) • Long tube joined end to end
Xylem cells	Xylem cells transport water (plants) • Long tubes joined end to end • Hollow so water can flow through

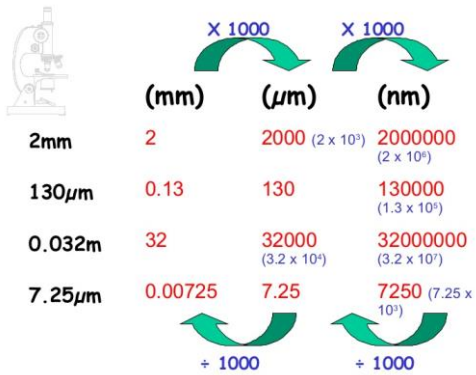
3. Comparing types of microscope

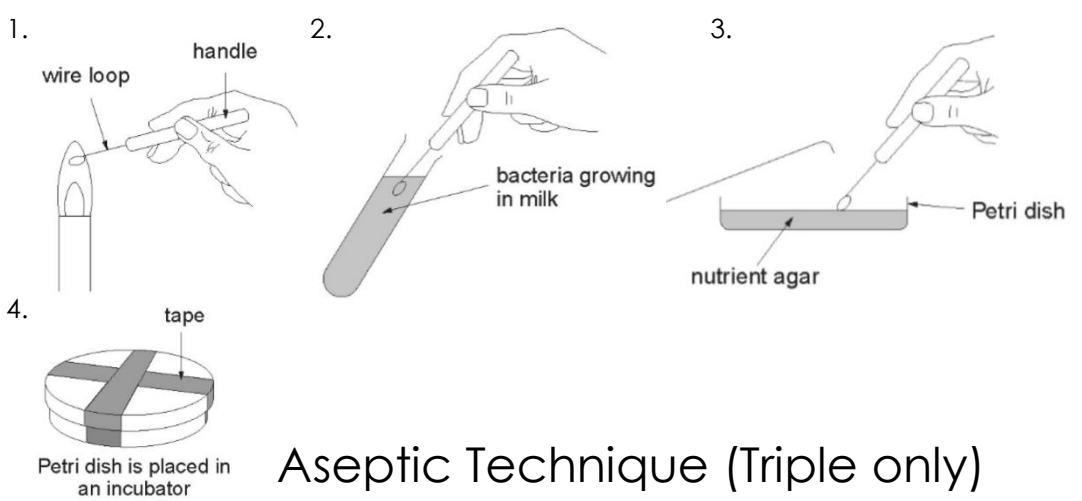
Type of microscope	Advantages	Disadvantages
Light microscope	1. Cheaper 2. Can see colours 3. Can see live specimen	1. Lower magnification
Electron microscope	1. Expensive 2. Higher magnification (x1000 more)	1. Can only see dead specimen 2. No colour

4. Calculating magnification

$$\text{magnification} = \frac{\text{size of image}}{\text{actual size of object}}$$

$$\text{actual size of object} = \frac{\text{size of image}}{\text{magnification}}$$





Aseptic Technique (Triple only)

5. Culturing micro-organisms TRIPLE ONLY

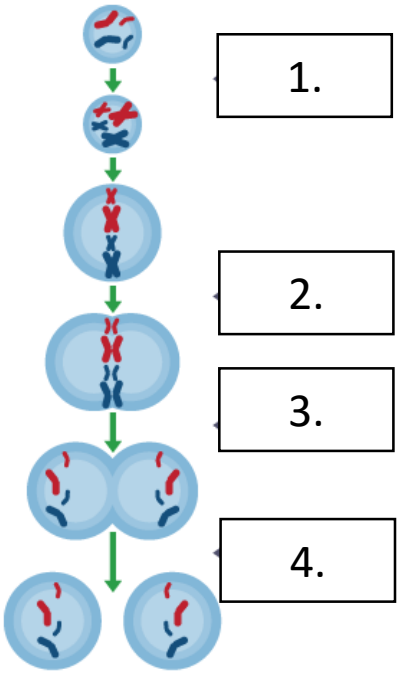
Keywords	
Binary fission	"Splitting in two" how bacteria divide every 20 mins
Agar gel	A gel of nutrients bacteria can grow on
Nutrient broth	A liquid bacteria grow well in
Colony	A group of bacteria making a small circular shape
Inoculating loop	A metal loop use to transfer microorganisms
Petri dish	A small plastic dish used for growing microorganisms
Aseptic	Free from bacteria and viruses
Incubator	Device kept at constant temperature to help the microorganisms grow

Aseptic technique	
prep	All agar plates and broth must be sterilised before use
1.	The inoculating loop must be sterilised by passing through a flame
2.	Sample to be cultured is taken using the loop
3.	Sample spread on agar in petri dish
4.	Dish sealed shut with tape and incubated at 25° C

6. Cell division Keywords	
Chromosomes	Long strands of DNA containing genes. Found in 23 pairs in a human
Cell cycle	The process the cell goes through to divide
Mitosis	A type of cell division that creates 2 identical daughter cells
Therapeutic cloning	Using an embryo create to have the same genes as the patient. Controversial

8. Transport in cells		
Keywords	Definition	Examples
Diffusion	The passive movement of a substance from an areas of high concentration to an area of low concentration	• Oxygen and carbon dioxide in the lungs • Perfume in a room
Osmosis	The movement of **water** molecules across a partially permeable membrane from a less concentrated solution to a more concentrated solution.	• Water uptake in plants • Water absorption in the intestine
Active transport	Movement of a substance from a lower concentration to a higher concentration, against the concentration gradient. **Uses energy.**	• Mineral absorption by roots • Glucose absorption by the intestine
Surface area to volume ratio	The surface area divided by the volume expressed as a ratio	All high • Unicellular organisms • Alveoli in the lungs • Villi in the intestines

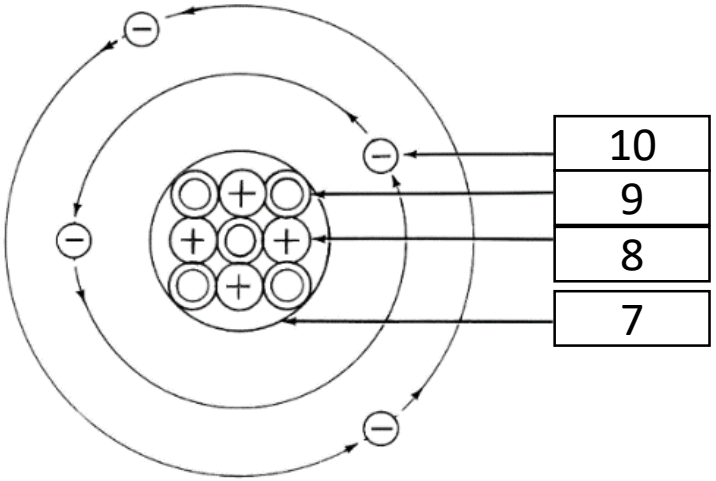
7. Stages of mitosis	
1.	The cell grows and copies all its DNA, mitochondria and ribosomes
2.	The nucleus dissolves and the copied chromosomes pair up
3.	The chromosomes are pulled to opposite sides of the cell
4.	The cytoplasm and cell membrane divides making two identical cells



9. Factors that effect the rate of diffusion/osmosis	
Speed up	Slow down
High concentration gradient	Low concentration gradient
High temperature	Low temperature
High surface area of membrane	Low surface area of membrane

Chemistry topic 1: Atomic structure

1. Keywords	
1. Atom	The smallest possible piece of an element. Has a radius of 0.1nm (or $1x10^{-10}m$)
2. Element	A substance in which all the atoms have the same atomic number
3. Isotope	Atoms with the same number of protons but different numbers of neutrons
4. Molecule	Two or more atoms bonded together
5. Compound	Two or more <u>different</u> atoms bonded together
6. Mixture	At least two different elements or compounds together. Can be separated easily
7. Nucleus	The centre of an atom. Contains protons and neutrons
8. Proton	A positively charged particle found in the nucleus
9. Neutron	A neutral particle found in the nucleus. Has no charge
10. Electron	A negatively charged particle found in energy levels (shells) around the nucleus



2. Properties of sub-atomic particles			
Particle	Relative mass	Relative charge	Location
Proton	1	+1	Nucleus
Neutron	1	0	Nucleus
Electron	0	-1	Shells

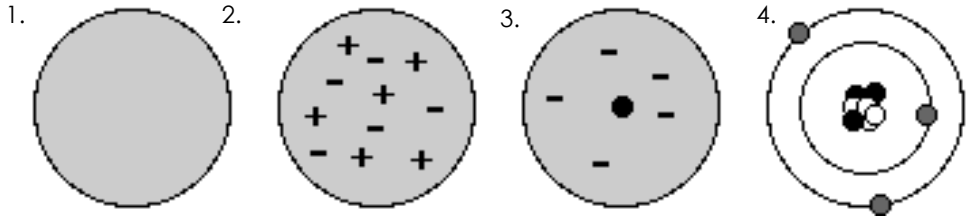
Key

relative atomic mass
atomic symbol
name
atomic (proton) number

1
H
hydrogen
1

3. Using the periodic table		
Number of..	Is the…	Found by..
Protons	Atomic (proton) number	Smaller number on periodic table
Electrons	Atomic (proton) number	Smaller number on periodic table
Neutrons	Difference between the atomic mass and atomic number	Big number – small number

4. History of the atom			
Discovery	By	Model	Diagram
Solid particle called atom	John Dalton	Particle: solid spheres	1
The electron	JJ Thompson	Plum pudding: positive 'cake' with negative 'plums'	2
Nucleus	Rutherford	Nuclear: Positive nucleus surrounded by electrons	3
Neutron	James Chadwick	Nuclear: Now with protons and neutrons in nucleus	3
Energy levels (shells)	Niels Bohr	Planetary: Electrons now 'orbit' in different shells	4



5. Electron arrangement rules	
1.	Always fill from the inside to the outside
2.	The first shell can only hold 2 electrons
3.	The second and third can hold 8

6. History of the Periodic Table	
Invented by	Dmitri **Mendeleev**, a Russian scientist.
Arranged	In order of **atomic mass**, and by their **chemical properties**
What was special about it?	**Predicted** the existence of **other elements** not discovered, and **left gaps** for them in his table
Why was it used?	**New elements** were **discovered** that **matched these gaps**

7. Properties – metals and non-metals		
Property	**Metals**	**Non-metals**
Density	High (they feel heavy for their size)	Low (they feel light for their size)
Strength	Strong	Weak
Malleable or brittle	Malleable (they bend without breaking)	Brittle (they break or shatter when hammered)
Conduction of heat	Good	Poor (they are insulators)
Conduction of electricity	Good	Poor (they are insulators) apart from graphite

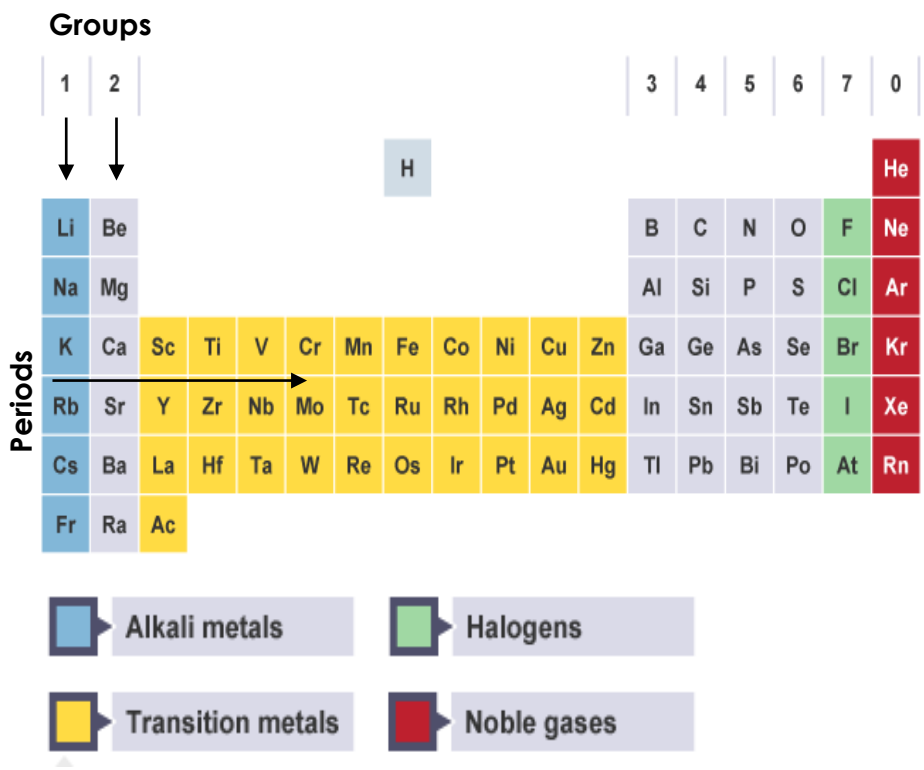
Period	No. of shells
1	1
2	2
3	3
4	4
5	5
6	6
7	7

TL/DR:

Group number
Tells you're the number of outer electrons

Period number
Tells you how many shells

8. Layout of the periodic table



Group	1	2	3	4	5	6	7	8
Electrons in outer shell	1	2	3	4	5	6	7	8
Charge of ion	+1	+2	+3	N/A	-3	-2	-1	N/A
Number of covalent bonds	N/A	N/A	N/A	4	3	2	1	N/A

N/A = not applicable (does not do it)

9. Properties – Groups 1 and 7											
Group 1 (I)	**Melting point**	**Density**	**Reactivity**	**Group 7 (VII)**	**Melting point**	**Density**	**Reactivity**	**Group 0 (VIII)**	**Melting point**	**Density**	**Reactivity**
Lithium (Li)	**Decreases** down the group	**Increases** down the group	**Increases** down the group	Fluorine (F)	**Increases** down the group	**Increases** down the group	**Decreases** down the group	Helium (He)	**Increases** down the group	**Increases** down the group	**INERT** **(DO NOT REACT)**
Sodium (Na)				Chlorine (Cl)				Neon (Ne)			
Potassium (K)				Bromine (Br)				Argon (Ar)			
Rubidium (Rb)				Iodine (I)				Xenon (Xe)			

10. Transition metals (TRIPLE ONLY)	
Properties compared to group 1 elements	Other useful properties
More dense	Ions can have different charges
Harder	Form coloured compounds
Stronger	Good catalysts
Higher melting points	
Less reactive	

11. Common separation techniques
1. **Chromatography** Used to separate a mixture of dyes in ink.
2. **Filtration** Used to separate insoluble solids from liquids (e.g. sand from water).
3. **Evaporation** Used to separate a soluble salt from solution. The solution is heated strongly in an evaporating basin until dry crystals are left.
4. **Crystallisation** Used to separate a soluble salt from solution. The solution is heated gently in an evaporating basin until crystals form; the remaining liquid is filtered out.
5. **Simple distillation** Is used to separate a liquid from a solution – e.g. water from ink. A condenser is used to cool hot gas until it forms a liquid.
6. **Fractional distillation** Used to separate a mixture of liquids with different boiling points.

Physics topic 1: Energy

1. Key Term

Key Term	Definition
Kinetic energy (KE)	The energy an object has because it is moving
Gravitational potential energy (GPE)	The energy an object has because of its position
Elastic potential energy	The energy stored in a springy object when you stretch or squash it
Thermal energy	The energy a substance has because of its temperature
Chemical energy	The energy stored in fuels, food, and batteries
Conservation of energy	Energy cannot be created or destroyed only transferred.
Work done	The energy transferred by a force
Dissipation	The process of energy being transferred or lost to the surroundings
Friction	A force that opposes movement
System	An object or group of objects
Closed system	An isolated system where no energy transfers take place into or out of the energy stores in the system.
Useful energy	Energy in the place it is wanted in the form that it is needed in
Wasted energy	Energy that is not usefully transferred, usually as thermal.

2. Calculating efficiency

1. Efficiency = $\frac{\text{Useful output energy transferred by the device}}{\text{Total input energy supplied to the device}}$

2. Efficiency = $\frac{\text{Useful power out}}{\text{Total power in}}$

3. No device can be more than 100% efficient.

4. Machines waste energy because of friction between their moving parts, air resistance, electrical resistance, and noise.

5. Energy is transferred by:

1. Heating
2. Waves
3. Electric current
4. Force when it moves an object.

3. Equations to recall and apply

Work done, W (joules, J) = **force applied, F** (newtons, N) x **distanced moved, s** (metres, m)

Change in objects gravitational potential energy store, ΔE_p (joules, J) = **mass, m** (kilograms, kg) x **Gravitational field strength, g** (newtons per kilogram, N/kg) x **Change of height, Δh** (metres, m)

Elastic potential energy, E_e (joules, J) = ½ x **spring constant, k** (newtons per metre, N/m) x **extension^2, e^2** (metres, m)

Kinetic energy, E_k (joules, J) = ½ x **mass, m** (kilograms, kg) x **speed^2, v^2** (metres per second, m/s)

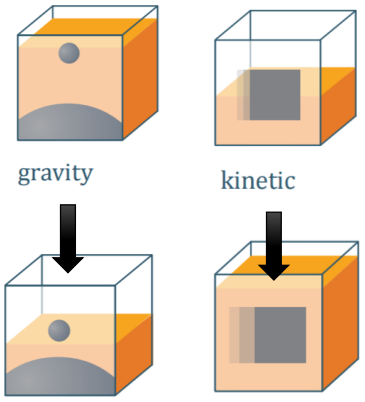
4. Power

1. The more powerful an appliance, the faster the rate at which it transfers energy

2. **Power, P** (watts, W) = $\frac{\textbf{Energy transferred to appliance, E (joules, J)}}{\textbf{Time taken for energy to be transferred, t (seconds, s)}}$

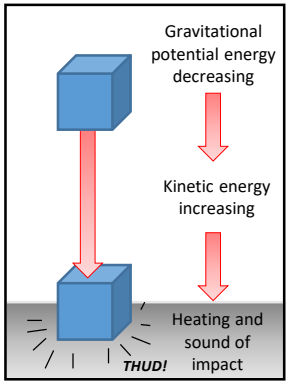
3. The power wasted by an appliance = total power input - useful power output

6. Conservation of energy in action



A falling object:

1. Decreases its GPE store
2. Increases its KE store as it falls
3. Waste energy transferred as thermal and sound



4. Energy Resources			
Energy Resource	Renewable	Advantages	Disadvantages
Fossil Fuels	No	• Low cost. • Easily transportable. • Reliable.	• Produces large amounts of Carbon Dioxide. • Produces some Sulfur Dioxide.
Nuclear	No	• Generates a lot of electricity. • Reliable.	• Expensive to construct and run. • Produces dangerous radioactive waste which will last for thousands of years.
Solar	Yes	• No fuel costs. • No pollution.	• Expensive to set up. • Doesn't work at night.
Wave	Yes	• No fuel costs. • Reliable.	• Can damage marine ecosystems. • Not everywhere is near water.
Tidal	Yes	• No fuel costs. • No pollution. • Reliable.	• Can damage marine ecosystems. • Not everywhere is near water.
Wind	Yes	• No fuel costs. • No pollution.	• Not always reliable. • Noisy. • Some think they are ugly (eyesore).
Geothermal	Yes	• No fuel costs. • No pollution.	• Very few areas where it is accessible.
Biomass	Yes	• Low cost. • Readily available. • Carbon neutral.	• Large scale land use requiring lots of water. • Destruction of habitat to grow crops.
Hydro-electric	Yes	• No fuel costs. • Reliable. • Easily controlled.	• Requires flooding land to build

Carbon neutral: a process by which no extra carbon is released to the atmosphere.

Year 9: Spanish

Travel and Tourism					
1	**las vacaciones**	holidays	18	**Grecia [f]**	Greece
2	**al extranjero; en el extranjero**	abroad	19	**los Estados Unidos**	United States
3	**dónde**	where	20	**las Islas Canarias**	Canary Islands
4	**una excursion/un viaje**	a trip	21	**Europa [f]**	Europe
5	**la comida/comer**	food/to eat	22	**Londres**	London
6	**el aeropuerto**	airport	23	**el Mediterráneo**	Mediterranean Sea
7	**viajar**	to travel	24	**alemán**	German
8	**en el campo**	in the country(side)	25	**británico**	British
9	**al lado del mar**	by the sea	26	**Escocés**	Scot ; Scottish
10	**Gran Bretaña [f]**	Great Britain	27	**Español**	Spanish
11	**Inglaterra [f]**	England	28	**europeo**	European
12	**Irlanda [f]**	Ireland	29	**francés**	French
13	**Escocia [f]**	Scotland	30	**galés**	Welsh
14	**Gales**	Wales	31	**griego**	Greek
15	**Alemania [f]**	Germany	32	**inglés**	English
16	**España [f]**	Spain	33	**irlandés**	Irish
17	**Francia [f]**	France	34	**latinoamericano**	Latin American

Year 9: Spanish

Travel and Tourism					
35	**norteamericano/a**	North American	52	**antiguo/a**	old
36	**sudamericano/a**	South American	53	**limpio/a**	clean
37	**el avión**	by plane	54	**famoso/a**	famous
38	**el vuelo**	the flight	55	**peligroso/a**	dangerous
39	**el autocar**	coach	56	**el país**	country
40	**el coche**	car	57	**la isla**	island
41	**el barco**	boat	58	**el mar**	sea
42	**el tranvía**	tram	59	**la playa**	beach
43	**a pie**	on foot; walking	60	**la montaña**	mountain
44	**la autopista**	motorway	61	**estar de vacaciones**	to be on holiday
45	**la carretera**	highway	62	**Yo fui**	I went
46	**el conductor**	driver	63	**Tu fuiste**	you went
47	**el carnet de conducir ; el permiso de conducir**	driving licence	64	**Él/ella fue**	he/she went
48	**el alojamiento**	accommodation	65	**nosotros fuimos**	we went
49	**el albergue de jóvenes**	youth hostel	66	**vosotros fuisteis**	you (plural) went
50	**el hotel**	hotel	67	**ellos/ellas fueron**	They (m/f) went
51	**el aire acondicionado**	air conditioning	68		