KNOWLEDGE ORGANISER BOOKLET

YEAR 9 – CYCLE 3

2025-2026

Name:

Tutor Group:

Contents

Instructions for Use

For all of your subjects, there are certain **facts** that you **need** to know in order for you to best understand the content you study in lessons.

In this booklet are ***Knowledge Organisers*** for each subject which contain the core concepts that you have to know to be successful in your lessons.

The **first 15 minutes** of Home Learning is the same in all subjects (apart from Maths) and should be completed in your single **Home Learning exercise book**:


Look: read a specific section of the *Knowledge Organiser*.


Cover: cover it over or put it to one side;


Write: from memory, write out as much of the information as you can remember for that section;


Check: check back with the *Knowledge Organiser*. Anything missing or incorrect, add in purple pen.


Review: information you didn't recall the first time you may wish to check in a different format, such as repeating the process or creating revision cards.

The next lesson, your teacher will check that you have completed this process and you will be quizzed in your subject lesson to see what you can recall.

Instructions for Use : Example

Show My Homework **for Geography says: ‘Knowledge Organiser: How to Read Grid References’.**

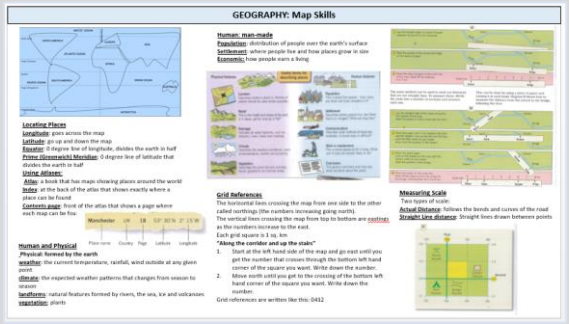
1. L**OOK:** carefully read the section of the *Knowledge Organiser* which you are learning.

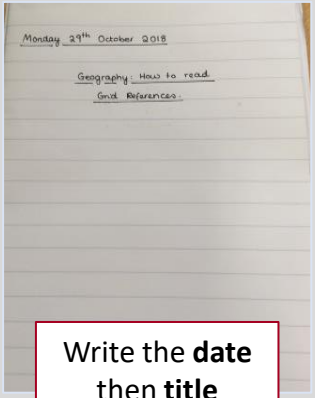
2. **COVER:** cover it over or put it to one side.

3. **WRITE:** write out as many details as you can from memory.

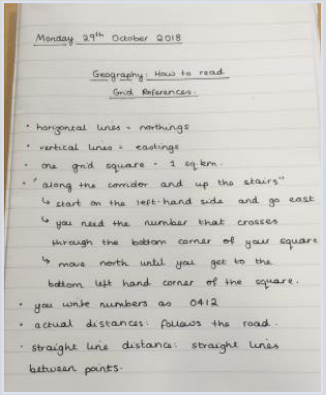
4. **CHECK:** check back over your answer with the *KO*. Anything which is missing or incorrect, add in in **purple pen**.

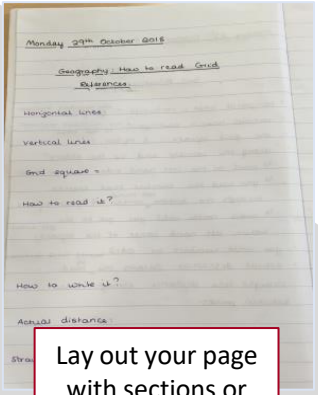
5. **REVIEW:** if you had significant gaps or parts you didn’t understand, repeat the process from Step 1.



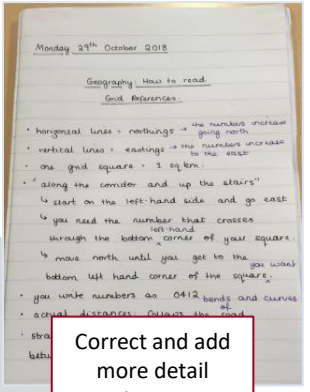


Write the **date** then **title** (**subject: focus**)





Lay out your page with sections or questions to help



Correct and add more detail using your purple pen.

sparx is your Maths homelearning

You do not have a knowledge organiser for maths. This is because the best way to remember and understand mathematics is to do it. Write your Sparx password in the space below so you don't forget it.

Sparx username: .....

Sparx password: .....

How do I log on?

Go to www.sparxmaths.uk. Select ***Kingsbridge Academy*** and enter your username and password.

What do I have to do each week?

Complete all of your Compulsory Section Sparx homework and get it 100% correct. If within your hour of home learning time you should complete the target and optional sections which are designed to help you make better progress in Maths.

How long should it take?

Sparx will adjust your homework so it should take about 1 hour. If you find yourself taking longer than this you should make sure you are coming for help on the difficult bits.

When should I do it?

You should complete your Sparx homelearning in the 4 allocated 15 minute slots in your homelearning timetable

What if I get stuck or can't do it?

You can watch the videos, ask a friend or parent or ask a maths teacher (in person or by email).

Why do I get different questions to my friend?

Sparx creates a custom homework just for you – because you are an individual. We are really pleased that we are able to offer you personalised homework.

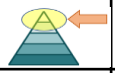
Why do I have to do 100%?

We care about you and believe that you deserve to do well in maths. Students who do all questions learn more and get better results.

J. B. Priestley's *An Inspector Calls*: Knowledge Organiser

English

Key Vocabulary

	**Social justice**	Fairness in the way people are dealt with in society.
	**Inequality**	Fairness in the way people are dealt with in society.
	**Class**	The grouping of people in society according to social status and wealth.
	**Community**	People who are considered as a unit because of their common interests, social group, nationality etc.
	**Influence**	The power to have an effect on people or things (or a person or thing that is able to do this).
	**Prejudice**	An opinion, formed in advance, about a particular group of people or things.
	**Responsibility**	A duty to care for something; blame.
	**Expose**	To make something that is covered or hidden able to be seen; To make public something bad or dishonest.
	**Privilege**	The power and advantage that only a small group of people have, usually because of their wealth or high social class.
	**Society**	People in general thought of as a group.
	**Social elite**	The richest, most powerful, best-educated or best-trained group in a society.
	**Remorse**	A feeling of sadness and being sorry for what you have done.

QUICK OVERVIEW: 'An Inspector Calls' is a play by J.B. Priestley. Through the play, Priestley attempts to expose what he views as the problems with society and offers the audience an alternative, socialist, viewpoint. Writing at the end of World War 2, the play is Priestley's warning about what to avoid when rebuilding society at the end of the war. The socialist ideas he explores in it would have been popular with many of his first audience: Britain had recently elected the socialist Labour Party when the play was first performed. Priestley's play captures the spirit of the time, in particular a sense that different parts of society could work together to build a better, fairer Britain.

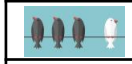
Plot Overview

The Birlings celebrate the engagement of Sheila and Gerald. → The Inspector calls: we learn of the victim, Eva Smith. → The Inspector interrogates the Birlings and Gerald one-by-one (Mr Birling, Sheila, Gerald, Mrs Birling, Eric). → The Inspector's final speech. → The aftermath of the Inspector's visit. → The ending.

Key Quotations

1. 'unsinkable, absolutely unsinkable' – Birling about the Titanic	2. 'like bees in a hive – community and all that nonsense' - Birling	3. 'we are members of one body.' – Inspector (final speech)	4. 'You mustn't try to build up a kind of wall between us and that girl.' – Sheila
5. 'swallowed a lot of strong disinfectant. Burnt her inside out' – the Inspector's description of Eva Smith's death	6. '. 'a man has to mind his own business and look after himself and his own – and –' – Birling	7. 'Girls of that class.' – Mrs Birling about Eva Smith / working class women	8. 'pink and intimate [...} brighter and harder". – Lighting instructions from the stage directions
9. 'Just used her for the end of a stupid drunken evening, as if she were an animal, a thing, not a person' – Inspector about Eric's treatment of Eva Smith	10. 'Everything's all right now, Sheila. (Holds up the ring.) What about this ring?' – Gerald just before the end of the play	11. 'If men will not learn that lesson, then they will be taught it in fire and blood and anguish.'	For more information about what you can say about the key quotes, see the quote summary revision worksheet.

Key Context:

	Working class life in 1912	Nearly 80% of people in Britain were working class in 1912. Life was hard, hours were long and pay was low. There was little job security.
	Class prejudice	Many in the social elite were prejudiced against the working class and believed that they were less moral than members of the social elite.
	Charity: the 'deserving' and 'undeserving' poor	There was little support for those in need. One form of support was charity; however, many who ran charities believed in the idea of the 'deserving' and 'undeserving' poor; in other words, you had to prove you deserved help.
	The welfare state	The welfare state is a system, paid for by taxes, that supports those in need (e.g. if unemployed). There was virtually no welfare state in 1912.
	Capitalism and socialism	These are contrasting beliefs about how a society should be run. **Priestley was a socialist** – very broadly, he believes that society is unbalanced and that workers should have more power. British society was largely capitalist in 1912; Priestley wanted to change this.

Character Functions

Eva Smith: the victim – used to show the consequences of… a selfish attitude to responsibility, an uncaring social elite, an unequal society, class prejudice, a capitalist society); used to symbolise the working class; used to show the need for socialism.

The Inspector - used to expose… the lack of social justice in society, the immorality of the social elite, the suffering of the working class, the need for change in society, the failings of capitalism; used as Priestley's mouthpiece to present socialist ideas.

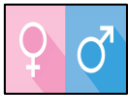
Birling: the 'murderer' – not *actually* a murderer of course (it was suicide); used to symbolise capitalism and an arrogant social elite; used to represent a selfish worldview; presented as the problem with society; presented negatively to undermine these things; uses to represent the older generation.




Mrs Birling, Eric, Sheila, Gerald – the other 'killers' – together with Birling, they represent an immoral and selfish social elite: the problem with society. In addition, they are used for the following functions:

Mrs Birling: to show class prejudice and the failings of charity; to show a woman kept in her ivory tower and ignorant about the real world.
Sheila and Eric: to represent the younger generation and their ability to learn and change.
Sheila: to show naivete about the real world; to contrast with Eva Smith's life.
Gerald: to symbolise the upper class.

Themes and Ideas:

Inequality and social justice		Priestley exposes the lack of social justice in society: the social elite live in comfort while the workers suffer.
Responsibility		The play suggests that we have a responsibility to look after each other (and not just ourselves as Birling suggests).
Class		Priestley uses the play to expose the problem of class prejudice; he also exposes the immorality of the social elite and the suffering of the working class.
Gender		The play highlights the gender divide and the relative powerlessness of women. However, it also shows how class affects gender expectations (Sheila vs Eva).
Morality		The play exposes the truth about morality as he sees it: that contrary to class prejudice, it is the so-called 'respectable citizens' who are immoral.
Power		The play exposes how power is abused by those who have it and the suffering it causes; it reveals the unfair imbalance of power in society.
Capitalism versus socialism		Priestley – a socialist – uses the play to expose the failings of capitalism (through Birling and Eva Smith) and to show the need for socialism (through the Inspector).

J. B. Priestley's *An Inspector Calls*: Knowledge Organiser

Writer's Craft:	
Characterisation	Priestley shapes characters to serve purposes. See 'Character Function'.
Genre	Priestley uses genre conventions of a whodunnit to make the play feel like a murder investigation. The characters take on the roles of a whodunnit: victim, detective, 'murderers'.
Structure	The play is structured to provide evidence of why Birling's view of the world is wrong. The Inspector builds a case and reveals who is guilty. We also see characters develop differently (e.g. young vs old).
Cyclical structure	The end of the play suggests that we have returned to (almost) the beginning and that the Birlings are about to relive the investigation (perhaps repeatedly until they all learn their lesson).
Setting	The play is set in Britain in 1912 – a time when society was particularly divided between rich and poor (and before the horrors of two world wars). Priestley wants to show how *not* to rebuild society.
Lighting	The change of lighting is highly symbolic and represents the Inspector dragging the Birling's out of their cosy ivory tower; the lighting symbolises the truth being exposed by the Inspector.
Mouthpiece	A mouthpiece is someone who is used to speak another person's views. The Inspector is Priestley's mouthpiece. He is used to speak Priestley's socialist views to the audience.
Rhetoric	The Inspector's final speech makes use of rhetoric. Priestley doesn't just want the audience to *hear* the socialist message, he wants them to be *persuaded* by it.
Dramatic irony	Dramatic irony is when the audience knows something a character doesn't. Priestley uses dramatic irony to undermine Birling through his inaccurate predictions.

'Genre: Morality Play

An Inspector Calls' could be classed as a **morality play**.

Morality plays were popular during the 15th and 16th-centuries. Historically **they sought to teach the audience lessons** that focused on the seven deadly sins: lust, gluttony, greed, sloth, wrath, envy and pride. Whilst characters who committed these sins were punished, if a character repented then they could redeem themselves.

An Inspector Calls is a morality play because all of the Birlings and Gerald Croft commit crimes which are similar to the seven deadly sins. Not all of the characters manage to redeem themselves.

Priestley uses the morality play structure to teach a 20th-century audience a series of lessons that relate to his beliefs about social responsibility, age, gender and class. The audience is invited to enjoy judging these characters - they are also forced to question their own behaviour.

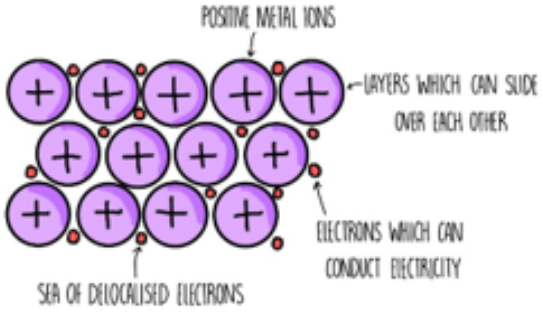
Genre: Well-Made Play

'An Inspector Calls' doesn't just draw on the whodunnit genre; it is also a well-made play. This a *type* of play developed in the 19th century. It has the following conventions:

- A tight plot.
- Many key events take place before the action of the play – revealed through exposition (exposition – the opening of a story in which all the information that an audience needs to understand the situation is put across).
- Involve the build up of suspense.
- Typically used letters, mistaken identities or secrets as dramatic devices.
- Resolution (the tying up of loose ends at the end of a story) involves a return to order in which all problems are solved (i.e. a happy ending). This is the only genre convention that doesn't appear in 'An Inspector Calls'.

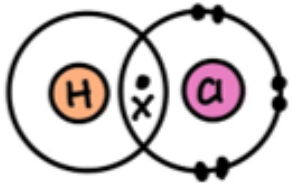
1 Bonding Review

Metals only = Metallic

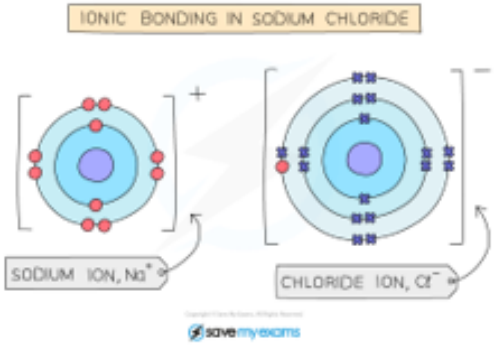


Non-metals only = Covalent

HYDROGEN CHLORIDE

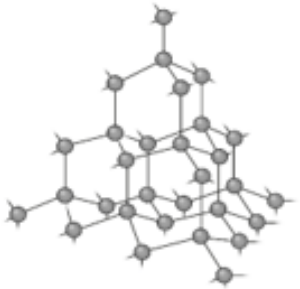


Metal + Non-metal = Ionic



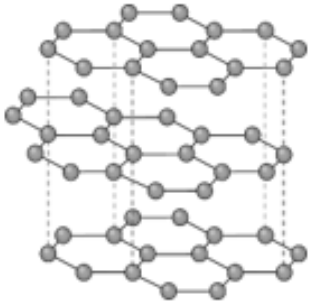
2 Giant Covalent

Diamond
Used in drill bits/ jewellery



Made up of many Carbon atoms in a regular repeating pattern (lattice).
Each carbon atom has 4 bonds.
It is extremely strong.
This helps it to cut through materials.
Difficult to scratch (hard)
High melting points/ boiling points.
It doesn't conduct electricity because it has no free moving charges (no ions or delocalised electrons)

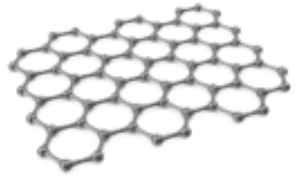
Graphite
Used in pencils and electrodes



3 bonds per carbon atom.
The layers can slide over each other.
It is an electrical conductor because it has delocalised electrons between the layers.
High melting points/ boiling points.
Graphite has strong covalent bonds, in a giant structure, which require a lot of energy to break.

3 Giant covalent - fullerenes

Graphene
Used in electronics and composites (mixed with other materials with contrasting properties)

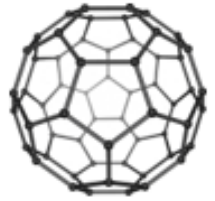


Graphene is a single layer of graphite.
It has 3 bonds per carbon atom, in hexagons
It has a high melting and boiling point, due to strong covalent bonds that take a lot of energy to break (large lattice).
It conducts electricity (free delocalised electrons)

Fullerenes- carbon nano tubes
Used in electronics/ strengthening tennis racquets

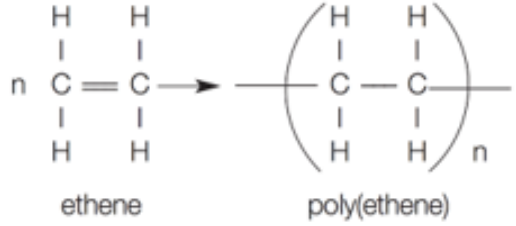
3 bonds per carbon atom.
High length to diameter ratio
Lightweight
Conduct electricity and heat- delocalised electrons.
Strong (high tensile strength 'ability to not break when stretched')

Buckminster fullerene
Used in drug delivery (Cage)/ Lubricants (rolling) Catalysts (speed up reactions)



60 Carbon atoms in a ball.
Can cage other molecules
High surface area
Can roll/ slide

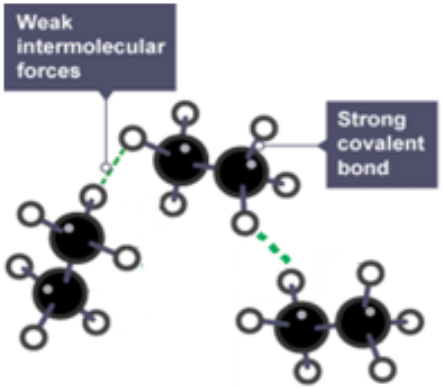
4 Polymers



Monomers-
Single molecules e.g. ethene

Polymers-
Many molecules joined in long chain e.g. polyethene (plastic)

The intermolecular forces **between** different molecules of propene are **weak** (simple molecular covalent) **– gas at room temperature.** This is because the molecules are **small.**

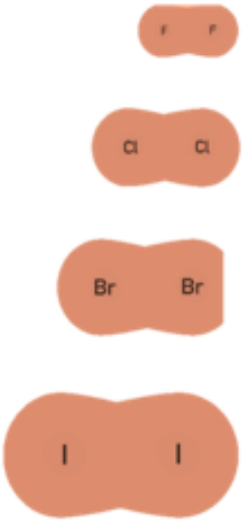


The **intermolecular forces between** molecules of polypropene are **strong**- **solid** at room temperature. This is because the molecules are **large. More energy required** to break the forces of attraction.

5 Boiling point trends

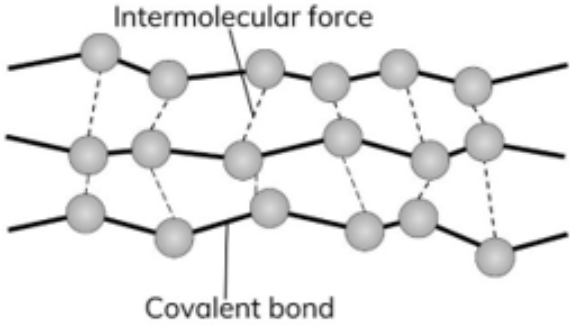
Group 7

- **As you go down group 7, the melting point increases.**
- **The larger the molecule the higher the melting point.**
- **This is because a larger molecule has stronger intermolecular forces, which take more energy to break.**



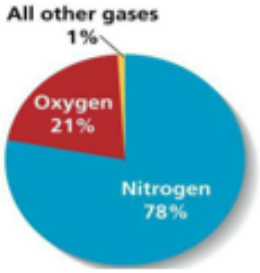
Polymers:

- **As the length of the chain is longer, the boiling point increases.**
- **This is because larger molecules have more intermolecular forces**
- **More forces require more energy to overcome them.**



6 Earth's atmosphere

The Earth's atmosphere has changed over time

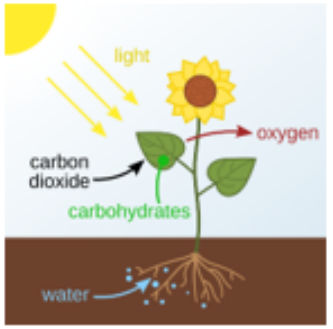


Current atmosphere:
78% Nitrogen
21% Oxygen
0.9% Argon
0.037% Carbon dioxide

- 4.5 Billion years ago, there was no oxygen, and lots of carbon dioxide. Volcanoes covered the Earth, releasing gases into the atmosphere.

- As the earth cooled down, water vapour condensed and fell as rain to form the oceans.

- Carbon dioxide (CO_2) could then dissolve into the oceans
- Simple plant life started to photosynthesise:
- Carbon dioxide+ Water → Glucose + Oxygen
- Carbon dioxide levels fell further, and oxygen levels started to increase.

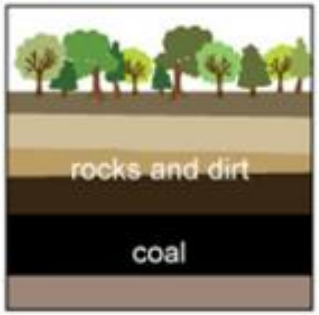


7 Carbon Stores

Carbon Sinks:
Areas which absorb and store carbon, e.g:

1. Life (especially plants)
2. Ocean
3. Ground

Fossil fuels are a store of carbon underground. Plants and animals from millions of years ago are buried by earth. Heat and pressure over time turns them into fossil fuels. E.g. coal.



Carbon can also be trapped in sedimentary rocks, such as limestone ($CaCO_3$ Calcium Carbonate)

8 Greenhouse Effect

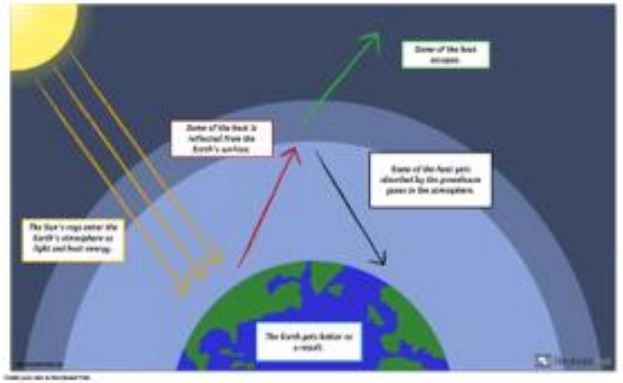
The Greenhouse effect is important for Earth.

Without the Greenhouse effect, Earth's average surface temperature would be significantly colder, around -18°C (0°F).

Examples of greenhouse gases:
Carbon Dioxide
Water vapour
Methane

How they work:

1. Short wavelength radiation is emitted by the sun
2. Short wavelength radiation is absorbed by Earth, and emitted as longer wavelength radiation
3. Greenhouse gases absorb and trap the long wavelength radiation, warming Earth.



9 Climate Change

Climate Change-
Changing trends in weather
Global Warming
The 'average' temperature across the globe has increased.

Examples of the impacts:

- Drought (lack of water)
- Ice caps melting
- Flooding
- Rising sea levels
- Wildfires
- Food shortages

This is from 'peer-reviewed' evidence:
The process of *other scientists checking* work *before* it is published.

400 thousand years is a long time ago. (before humans) Evidence for this has come from ice cores, fossil records and rock samples.

10 Pollutants

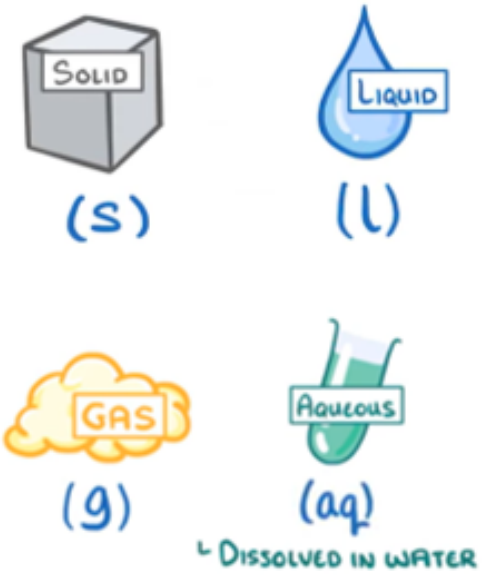
Pollutant	How it is made	Environmental impact
Carbon Dioxide	Complete combustion of fuels	Greenhouse gas- Global warming
Carbon Monoxide	Incomplete combustion of fuels	Toxic- Death
Carbon (soot)	Incomplete combustion of fuels	Breathing problems
Sulfur Dioxide	Sulfur impurities in fuels burning	Acid rain/ Breathing problems
Nitrogen Oxides	Nitrogen from the air reacting with oxygen in engines	Breathing problems

11 Chemical and Physical Change

Chemical change-
A new substance is formed in a chemical reaction.
e.g. Iron reacting with Sulfur
Iron + Sulfur → Iron Sulfide
$Fe_{(s)} + S_{(s)} \rightarrow FeS_{(s)}$

Physical change-
No new substance is formed; there is a change of state/ change in appearance. (*typically* easier to reverse this change)
e.g. water melting:
$H_2O_{(s)} \rightarrow H_2O_{(l)}$

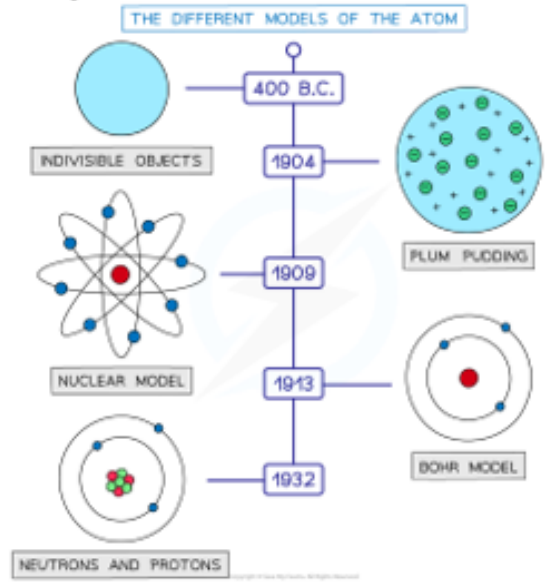
State symbols



Example:
CO_2 (g) + $Ca(OH)_2$ (aq) → $CaCO_3$ (s) + H_2O (l)

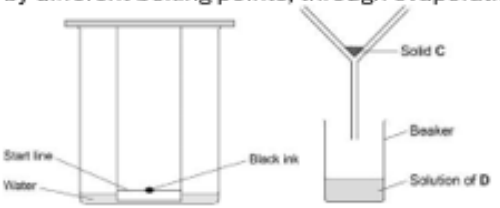
12/13 Review

History of the atom:



Separating techniques:

Chromatography – Separating by solubility
Filtration- Separating soluble and insoluble substances with filter paper.
Distillation- Separating substances by different boiling points, through boiling and condensing.
Evaporation / crystallisation- Separating substance by different boiling points, through evaporation.



Biology: Year 9 Cycle 3 Knowledge Organiser – Infection and Response & Levels of Organisation

Lesson 1: Discovery and Development of Drugs

Traditional drugs were extracted from plants and microorganisms:

- Heart drug **digitalis** – foxgloves
- Painkiller **aspirin** – willow bark
- Antibiotic **penicillin** (discovered by Alexander Fleming – *Penicillium* fungus)

New drugs are tested for their:

- **Toxicity** to check for side effects and see if they are safe
- **Efficacy** to see if the drugs cures the disease or improves the symptoms (are they **effective**).
- **Dose** to see how exactly much is required without being toxic

Drug Trials are done in this order:
Pre-clinical (computer modelling/human cells/animals
Clinical – healthy humans volunteers to check for side effects and efficacy and then people who have the condition in increasing doses.

Questions:

1. Where do the drugs digitalis, aspirin and penicillin come from?
2. Why are drugs tested for toxicity?
3. Why are drugs tested for efficacy?
4. What does the 'dose' of a drug refer to?
5. What is the difference between pre-clinical and clinical trials?

Lesson 2: Drug Trials

Three stages of testing drugs:
Pre-clinical Trials

- Computer models
- Skin cells grown using human stem cells in the lab (this allows the efficacy and possible side effects to be tested. Many substances fail this test because they damage cells or don't seem to work.
- If they don't seem to harm human cells they are tested on animals.*

Clinical Trials

- Tested on healthy volunteers to check they are safe.
- Tested on people with the disease starting on low doses and increasing it until the dosage is identified.

*In the UK, new medicines must undergo these tests. It is now illegal to test cosmetics and tobacco products on animals.

Placebo – a 'fake' drug that is like the real drug in every way except it doesn't contain any active ingredient. Identifies the psychological effects of taking something.

Questions:

1. What are the **pre-clinical** tests carried out on?
2. Why are **pre-clinical** tests carried out before **clinical** tests?
3. Why do medicinal drugs have to be tested on animals in the UK?
4. What is a placebo and why are they used in clinical drug trials?

Lesson 3: Health Issues

Definitions:
Health – a state of physical and mental well-being
Communicable Disease – caused by pathogens which are passed from one organism to another.
Non-communicable Disease – not caused by pathogens cannot be passed from one organism to another.

Some diseases interact:

- Defects in immune system (e.g. HIV) make people more likely to suffer from infectious disease e.g.. TB (bacterial lung infection).
- Some viruses can tigger cancers – e.g.. HPV can lead to cervical cancer.
- Immune reactions – initially caused by a pathogen can trigger allergies like skin rashes and asthma.
- Severe physical ill health can lead to depression and other mental illness

Questions:

1. What is the definition of **health**?
2. What is the difference between a **communicable** and **non-communicable disease**?
3. Why are people more likely to catch a communicable disease if their immune system is defective?
4. Why are teenagers advised to have an HPV vaccination in the UK?

Lesson 4: Effects of Lifestyle

Cardiovascular disease – fatty material builds up in arteries reducing blood flow to heart cells.

- Account for 25% of all deaths in UK.
- Risk factors - high fat/salt diet, smoking, stress, lack of exercise and genetics.

Emphysema/COPD – the lining of the lungs is broken down reducing the surface area for gas exchange.

- Risk factors include smoking and air pollutants

Lung cancer – uncontrolled cell division. Cells can break off the tumour, travelling in blood to other parts of body forming secondary tumour.

- The most common cause of death by cancer in the UK.
- Risk factors include smoking, radon gas, asbestos, air pollution

Reduced birth weights – babies born to smokers have lower birth masses

- The foetus receives less oxygen resulting in less energy transfer for growth.

Liver disease – liver cirrhosis (fatty liver) and liver cancer.

Foetal alcohol syndrome –children born with learning difficulties and other physical and mental problems.

- Drinking too much alcohol

Diabetes Type 2 – people struggle to control their blood glucose levels

- Risk factors include high sugar diet, lack of exercise.

Remember:

Correlation doesn't always mean **cause** scientists need to collect evidence.

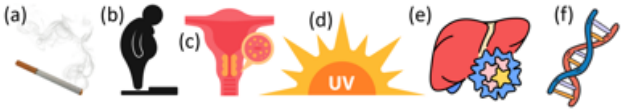
Questions:

1. Make a revision card to show the diseases and risks associated with them for non-communicable diseases.
2. Make a revision card of the correlation graphs.
3. Explain why correlation doesn't necessarily mean causation.
4. Make a revision card of how to make healthy choices to reduce the risk of getting a non-communicable disease.

Lesson 5: Cancer

Cancer	Changes in cells that lead to uncontrolled growth and division.
Benign tumours	Growths of abnormal cells contained in one area, usually within a membrane.
Malignant tumour	Cells off the tumour and spread to different parts of the body in the blood where they form secondary tumours.

Scientists have identified lifestyle **risk factors** for various types of cancer. There are also **genetic** risk factors for some cancers. **Anyone** can develop cancer. Having risk factors doesn't mean you'll get cancer it just **increases the chances.**



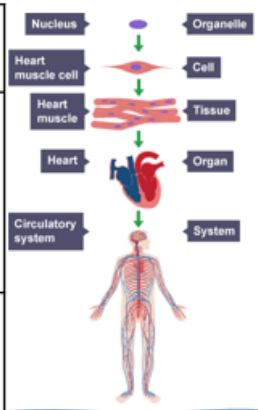
Smoking	Obesity	HPV	UV exposure	Hepatitis B & C	Genetic
• lung cancer	• bowel • liver • kidney	• cervical • mouth/throat • penis	• skin	• liver	• breast • prostate

Questions:

1. Give the definition of **cancer.**
2. What is the difference between **benign tumours** and **malignant tumours?**
3. How do secondary tumours develop?
4. Make a revision card showing the risk factors associated with certain types of cancer.
5. Why has smoking been banned in public places in the UK?

Lesson 6: Principles of Organisation

cells	Are the building blocks of all organisms.
tissues	A group of cells with similar structure and function e.g.. xylem, phloem, glandular, muscle, epithelial, nervous.
organs	A group of tissues working together to perform a function e.g.. heart, lungs, stomach, liver, brain, leaf, root.
organ system	Organs are organised into organ systems which form organisms e.g.. cardiovascular contains arteries, capillaries, veins and heart.



Subcellular Structures:
These are components of the cell like the nucleus, chloroplasts and mitochondria. They are organelles that carry out specific jobs in the cell.

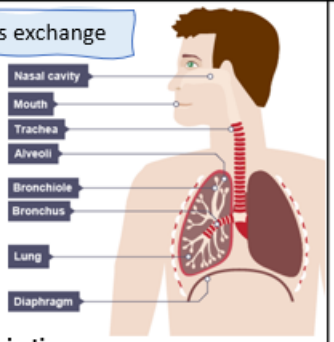
Questions:

1. Give the definitions of cells, tissues, organs and organ systems.
2. Put these structures in order starting from smallest to the biggest:
   organ tissue cell organism organ system nucleus

Lesson 7: Lungs

The lungs are adapted for gas exchange

Many alveoli	Increase surface area
Alveoli walls one cell thick	Short diffusion distance
Very good blood supply	Maintains a steep concentration gradient
Lungs well ventilated	Maintains a steep concentration gradient



Word equation for Aerobic Respiration:

glucose + oxygen → carbon dioxide + water + energy

d) Explain the differences shown in the table (you should write this out in your book).

Gas	Percentage (%) in air breathed in	Percentage (%) in air breathed out
Oxygen	21	16
Carbon dioxide	0.04	4
Nitrogen	78	78
In addition		
Water Vapour	variable	saturated
Temperature	cooler	warmer

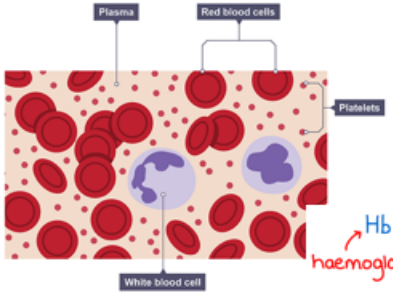
Questions:

1. How are the lungs adapted for gas exchange?
2. Draw and label the structure of the lungs.
3. Why is there a higher % of O_2 in breathed in air compared to exhaled air?
4. Why is there a lower % of CO_2 in breathed in air compared to exhaled air?
5. Why is the % of nitrogen in inhaled and exhaled air the same?

Lesson 8: Blood

Blood is a tissue as it is a group of living cells working together to **transport** things around the body.

Red blood cell	Carries oxygen
White blood cell	Protects the body against infection
Platelets	Involved in clotting. Prevents bleeding out and entry of pathogens
Plasma	Liquid part of transports proteins / dissolved substances / food (molecules) / urea / hormones / blood/cells



Haemoglobin is a protein found in red blood cells that binds **reversibly** to oxygen.

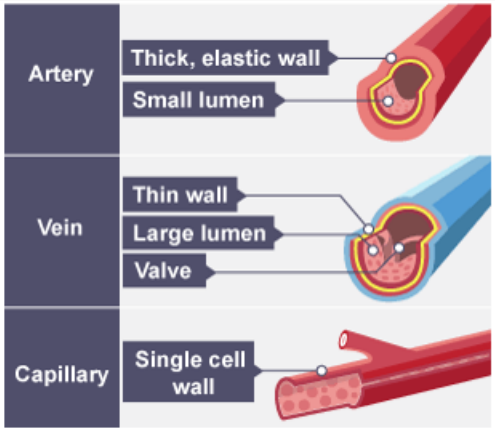
$Hb + 4O_2 \rightleftharpoons HbO_8$

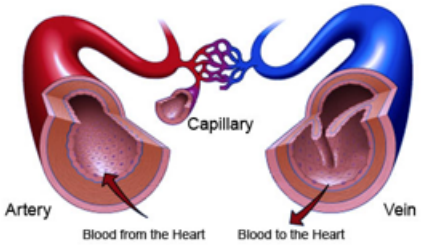
haemoglobin — oxyhaemoglobin

Questions:

1. Make a revision card to show the parts of blood and what their jobs are.
2. Why is blood a tissue?
3. Name the protein (pigment) found in red blood cells that binds reversibly to oxygen.
4. Name the molecule that forms when oxygen binds to haemoglobin.

Lesson 9: Blood Vessels

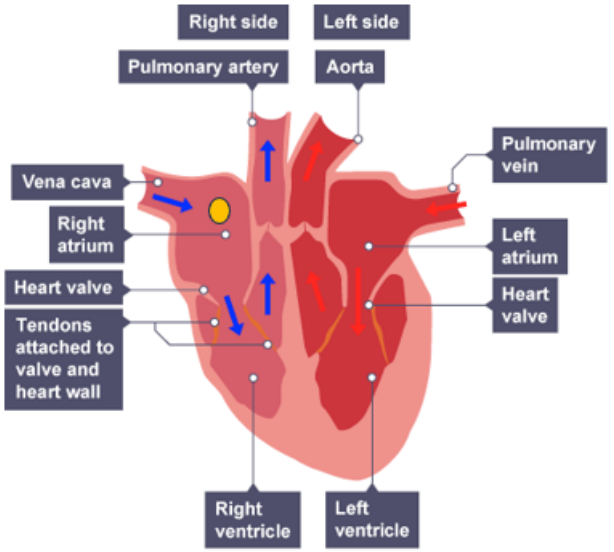




Questions:

1. Compare the structure of arteries and veins.
2. Compare the function of arteries and veins.
3. What is the function of the capillaries?
4. Why do veins need to have valves?
5. Why do arteries need thicker elastic and muscular walls than veins?

Lesson 10: Structure of the Heart

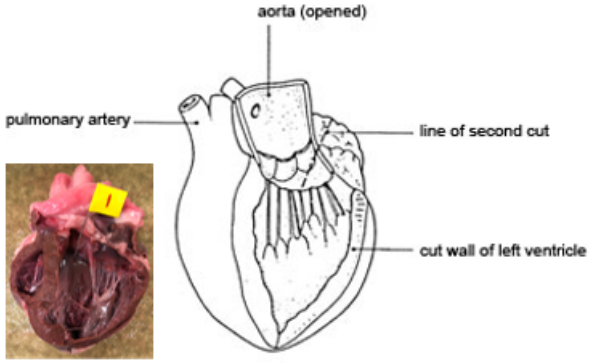


- SAN – the pacemaker of the heart sets up the rhythm of the heart

Questions:

1. Which side of the heart pumps blood to the lungs?
2. Which side of the heart pumps blood to the body?
3. Why is the heart called a double pump?
4. Why does the left and right side of the heart need to be separated?
5. What is the SAN and where is it located?

Lesson 11: Heart Dissection



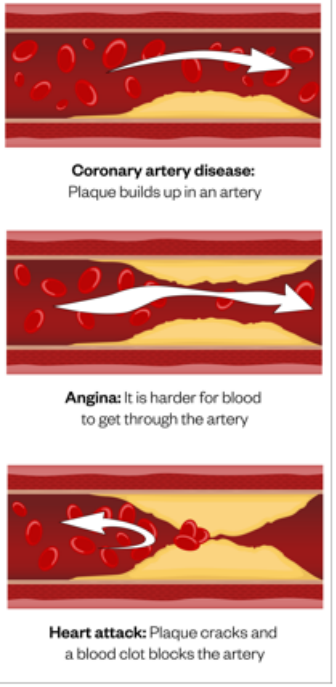
Drawing Rules:

1. Use a sharp pencil.
2. Use a ruler to draw label lines and don't add arrows.
3. Don't sketch or colour in.
4. Don't let label lines cross over.
5. Make sure label lines touch what you are labelling.
6. Draw things in proportion.
7. Add a title.

Questions:

1. Which vessel transports blood into the heart from around the body?
2. Which vessel transports blood around the body from the heart?
3. Which chamber contracts and forces blood into the aorta?
4. Why does the heart have valves?

Lesson 12: Coronary Heart Disease



Risk Factors for Cardiovascular Disease:

- Poor diet (too much saturated fat)
- Stress
- Obesity
- Salt (eating too much)
- Smoking
- Lack of exercise

Blocked coronary arteries supplying the heart –

- Less blood to heart
- Heart cells get less O_2
- Cells do less aerobic respiration
- Heart cells release less energy
- Heart muscle cells die
- Results in heart attack

Questions:

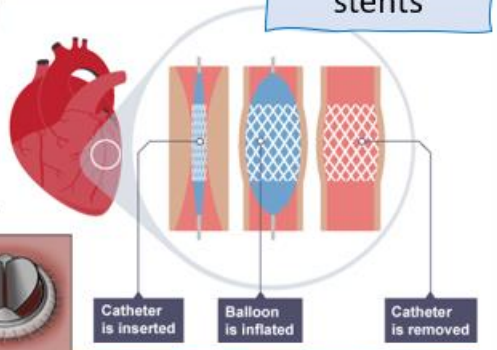
1. Which artery becomes blocked with fatty material?
2. What are the risk factors that make a heart attack more likely?
3. The plaque contains a fatty material called 'cholesterol' where does this come from?
4. Why might a blocked coronary artery lead to a heart attack?

Lesson 13: Treating Heart Disease

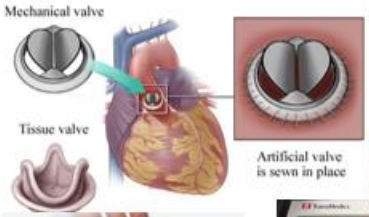
statins

Positives	Negatives
• Help to lower cholesterol so less likely to build up in coronary arteries. • Less cholesterol build up in your arteries reduces the risk of cardiovascular disease leading to a heart attack. • May protect you against other conditions like Alzheimer's disease.	• Should not be give to people with liver disease. • Need to be taken long-term. • If you stop taking them cholesterol levels rise again. • Some people experience head-aches. • Have been linked with Type 2 Diabetes. • Breast feeding women shouldn't take them.

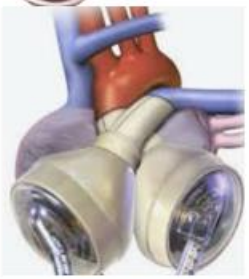
stents



Heart Valve Replacement



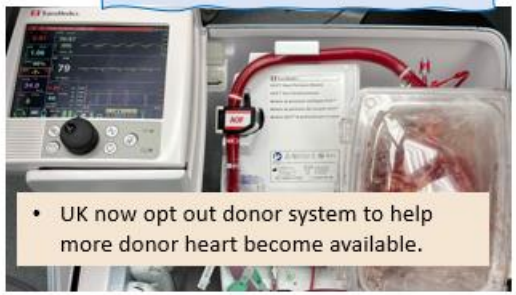
Mechanical valve	Biological valve from a pig
Made of plastic or metal	Made from living tissue
Can cause the blood to clot around the valve	No risk of blood clotting around the valve
No need for another replacement valve after 5 years	Sometimes another replacement valve is needed after 5 years



Artificial Hearts

Used to keep people alive while they are waiting for a donor heart.

Heart Transplants



- UK now opt out donor system to help more donor heart become available.

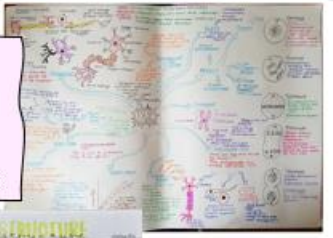
Questions:

1. What are the advantages of taking statins?
2. What are the disadvantages of taking statins?
3. How does a stent work?
4. Leaky valves can result in heart valve replacements. What are the advantages and disadvantages of a mechanical valve?
5. What are the advantages and disadvantages of biological valves?
6. Why would a patient who has had a heart transplant need to take **immunosuppressants** for the rest of their lives?
7. What are artificial hearts used for?

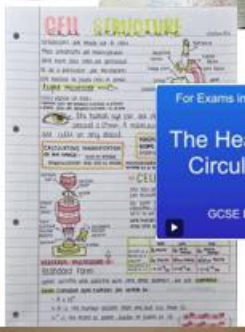
Revision:

Mind-maps

The process of making revision materials makes you more likely to remember the facts and make links across the ideas



Own notes



Videos

Personalise your revision different things work for different people.

Flashcards

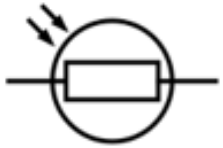
How to revise

1. Make some revision materials using reliable sources like Bitesize Science AQA Trilogy or the CGP Revision Guide.
2. Use the revision materials, look back at them, get people to quiz you on them.
3. Revise the things you don't know first.
4. Sort your pile of revision cards into things you know and things you don't and concentrate on the hard things.

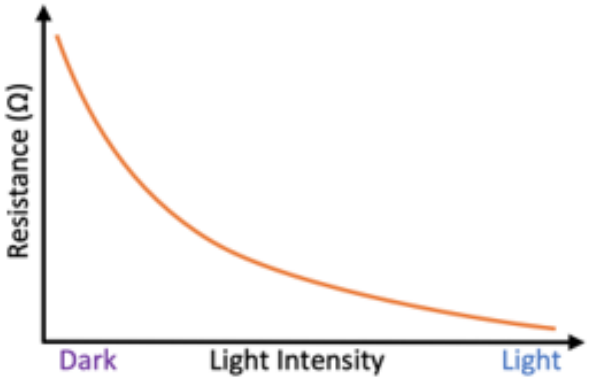
Lesson 1 – Light Dependent Resistors

Streetlights automatically turn on when it gets dark by sensing the **light intensity** using an electronic component.

This component is called a **light dependent resistor (LDR).**



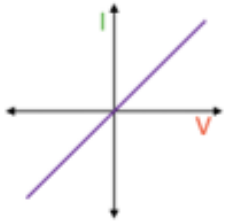
The **resistance** of an LDR depends on **light intensity**.



As the **light intensity** increases, the resistance of an LDR **decreases**.

Lesson 2 – Components Summary

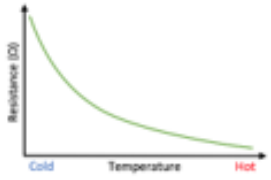
Resistor:
Resistance is **constant**.



Filament lamp:
As the potential difference increases, the **resistance increases** because the **temperature increases**.

Diode:
Has a very **high resistance** in the **reverse direction**, so current can only flow one way.

Thermistor:
As the **temperature** increases, the **resistance** decreases.

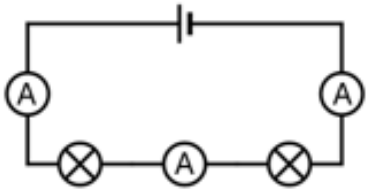


Lesson 3 – Current and PD in Series

Current in series:

An electric current is a flow of **charged particles** (electrons).

These must flow through each component **in turn**. Current is **the same** through components in **series**.

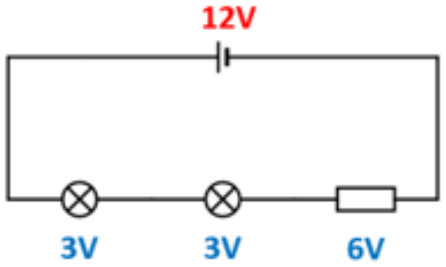


All the ammeters in this circuit would read the same value.

Potential difference in series:

An electron **transfers** some energy **each time** it passes through a component.

The potential difference from the cell/battery is **shared** between the other components.

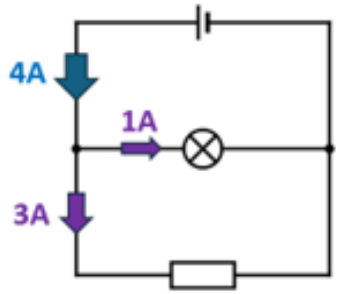


Lesson 4 – Current and PD in Parallel

Current in parallel:

The current **splits** when the circuit branches.

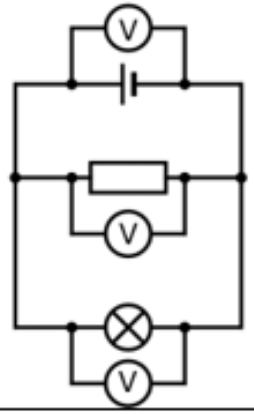
The total current is **the sum** of the currents through each branch.



Potential difference in parallel:

Each electron **only** passes through **one** branch of the circuit and transfers all of its energy.

The potential difference across **each branch** is the **same**.



All the voltmeters in this circuit would read the same value.

Lesson 5 – Resistance in Series and Parallel

Resistance is the opposition to the flow of current in a circuit.

If the resistance increases, the current decreases.

Resistance in series:
Each electron **must** pass through **all** components in series.

Therefore, the electron 'feels' the resistance of **every** component.

The **total resistance** is the **sum** of the individual resistances.

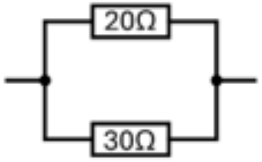
Three resistors are connected in series.

The total resistance would be **35Ω**.

Resistance in parallel:
Each electron **only** passes through **one** component in parallel.

Adding extra components in parallel adds **extra routes** that the current can flow through.

The **total resistance** is the **less** than the **smallest** individual resistance.



Two resistors are connected in parallel.

The total resistance would be **less than 20Ω**.

Lesson 6 – Comparing Series and Parallel

Look at the sections for Lessons 3, 4 & 5. Use the space below to summarise them:

	Series	Parallel
Current		
Potential difference		
Resistance		

Lesson 7 – Electrical Power

Power is the amount of energy **transferred each second**.

$$power = \frac{energy\ transferred}{time} \qquad P = \frac{E}{t}$$

The standard units for these are:
Power – Watts (W)
Time – seconds (s)
Energy – Joules (J)

The **power** of an electrical device can be calculated in two different ways:

$$power = potential\ difference \times current$$
$$P = VI$$

or

$$power = current^2 \times resistance$$
$$P = I^2R$$

How do car headlights provide both high and low power beams?

They have two different bulbs. They have different resistances and so draw different amounts of current. This gives them different power values.
Higher power = a brighter beam.

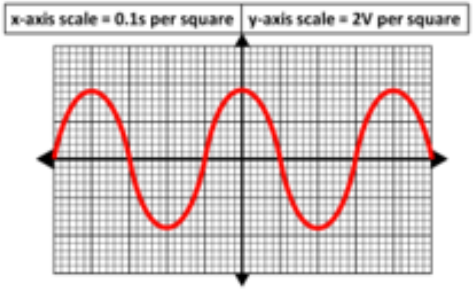
Lesson 8 – AC and DC

There are two types of electricity **DC** (Direct Current) and **AC** (Alternating Current).

- In DC, electrons flow in **one direction** only because the potential difference is **constant** (e.g. from a cell or battery).
- In AC, electrons **change direction** repeatedly because the potential difference **alternates** between positive and negative.

Graphs showing how the potential difference changes over time look like this:

Measurements of AC electrical signals can be made using an **oscilloscope**.
An oscilloscope shows a graph of potential difference against time with scales that can be changed.



Lesson 9 – Mains Electricity

Mains electricity in the UK is **AC** (Alternating Current) and uses a potential difference of **230V** at a frequency of **50Hz**.

UK plugs have **three pins**. These pins are usually made from **brass** as it is a hard material and is a **good conductor** of electricity.

The outside of plugs and wires are covered with **plastic**. This is because plastic has very high resistance and so is a **good insulator**, to prevent electric shocks.

There are three pins because UK electrical cables contain three **wires** that together make up the mains electrical circuit in our homes and businesses. Since 2006, these wires have had standard colours: **brown**, **blue** and **green & yellow**.

The **brown** wire is the "**live**". It has a potential difference of 230V and carries this high potential difference from the supply to the device being used.

The **blue** wire is the "**neutral**". It has a potential difference of 0V and completes the circuit back to the supply.

The **green & yellow** wire is the "**earth**". It has a potential difference of 0V and is only used if something goes wrong. If a **fault** occurs, the earth wire prevents the outside of the device from becoming live, therefore reducing the risk of electric shocks.

Lesson 10 – Mains Safety Features

Fuses

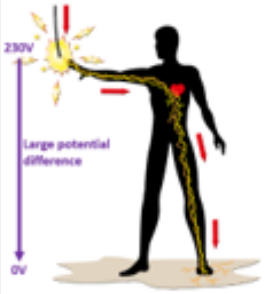
Fuses are designed to **melt** if the **current** is too high.

Fuses are **rated** to handle a certain amount of current before melting.

The correct fuse to use, is the one that is rated **just above** the current that the device needs.

The circuit symbol for a fuse is:

What is an electric shock?



An electric shock is when **current** flows **through the body** to earth.

Current will flow through the body if a person touches a live wire because there is a **large potential difference** between live and earth.

The earth wire

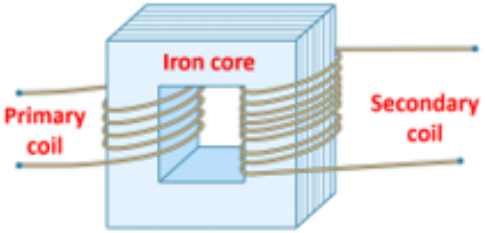
One end of the earth wire is connected to **earth**. The other end is connected to the **casing** of the device.

If a fault occurs, current flows **through the earth wire**. The current also **increases** as the earth wire has a **low resistance**. This causes the **fuse** to **melt**, breaking the circuit.

Lesson 11 - Transformers

Transformers are electrical devices that **change the potential difference** in a circuit.

Transformers are made of **two coils** of wire wrapped around an **iron core**.
The input to the transformer is the **primary coil**.
The output from the transformer is the **secondary coil.**



Step-up transformers

- Have **more turns** on the **secondary coil** than on the primary coil.
- **Increase** the potential difference.

Step-down transformers

- Have **fewer turns** on the **secondary coil** than on the primary coil.
- **Decrease** the potential difference.

The transformer equation:

$$V_p I_p = V_s I_s$$

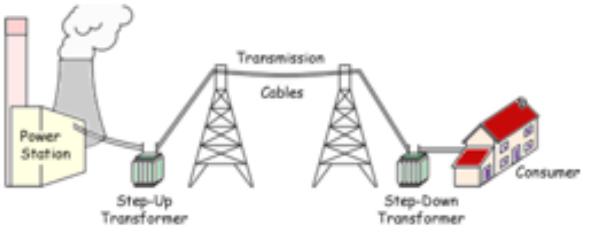
V_p is the PD across the primary coil
I_p is the current through the primary coil
V_s is the PD across the secondary coil
I_s is the current through the secondary coil

Lesson 12 – The National Grid

The **National Grid** is the system that links these energy resources to **consumers**. It contains **power cables** and **transformers.**

Investment in **new infrastructure** for the National Grid is **necessary** to meet the **rising demand** for energy from new technologies (e.g. electric cars).

New infrastructure is often **opposed** by local people however, due to "spoiling" the landscape or local area.



A step-up transformer **increases** the potential difference across the power lines.

This **decreases** the **current** and **reduces energy lost** from the cables due to heating.

Making the National Grid **more efficient**.

Lesson 13 – Cost of Electricity

Power is the amount of energy transferred each second.

We calculate the energy transferred by a device using the equation:

$$energy\ transferred = power \times time$$
$$\mathbf{E = Pt}$$

Energy companies do **not** measure electricity usage in **Joules (J)**. They use another unit: **kilowatt-hours (kWh).**

1 kWh is the **energy transferred** when a device with a **power** of **1kW** is used for **1 hour**.

Energy transferred in kWh can be calculated my multiplying the power in kW by the time in hours.

Energy companies **charge** a set amount for **each kWh** of electricity. In summer 2025, a typical charge is **25.7 pence per kWh**

Example question:
The PlayStation 5 has a power rating of **210W**.
Calculate the cost of using it for **8 hours**.
The price charged by the energy company is **25.7p/kWh**.

$$210\ W = 0.21\ kW$$
$$E = Pt$$
$$E = 0.21 \times 8$$
$$E = 1.68\ kWh$$
$$1.68 \times 25.7 = 43\ p$$

Review questions Lessons 1-6

1. Name the component that has a resistance that depends on light intensity.
2. As the light intensity increases the resistance of an LDR _____.
3. Sketch the IV Characteristic graph for a filament lamp.
4. As the _____ increases, the resistance of a thermistor _____.
5. Describe how current behaves in a series circuit.
6. Describe how current behaves in a parallel circuit.
7. In which type of circuit is the potential difference of the cell shared between the components?
8. What is the total resistance of two 20Ω resistors connected in series?
9. What is the total resistance of two 20Ω resistors connected in parallel (exact answer not needed)?
10. Compare how potential difference behaves in a series circuit to how it behaves in a parallel circuit,

Review questions Lessons 7-13

1. Define power.
2. State what happens to the power of a component if the current through it doubles.
3. Describe how electrons move in DC electricity.
4. Explain how electrons move in AC electricity.
5. Sketch a graph of potential difference against time for AC electricity.
6. What is the potential difference of UK mains electricity?
7. What is the frequency of UK mains electricity?
8. How is a step-up transformer different from a step-down transformer.
9. How are transformers used in the National Grid.
10. State the name and function of the brown wire in a UK plug.
11. State the name and function of the green & yellow wire in a UK plug.
12. Explain the role of a fuse.
13. Explain how an electric shock can occur if someone touches a live wire.

Yr9 Cycle 3: Art Activism

Artists and designers use text and images to create work with personal, political or social messages. Art has the potential to influence human behaviour. It can evoke emotion and provoke action.

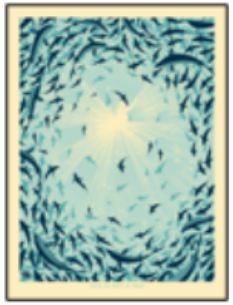
Ancient Grafitti 400 BC

'The Mechanical Head' by Raoul Hausmann 1920

'Earth Day' Poster by Robert Rauschenberg 1970

'Your Body Is A Battleground' by Barbara Kruger 1989

'Make Art Not War' 1997 Bob & Roberta Smith



'Power & Equality' 2021 & Earth Day poster 2014 Shephard Fairey

Art Activism is a term used to describe art that is used in the act of campaigning to bring about political or social change.

Art History – Key facts:

Ancient Graffiti The word "graffiti" was originally a technical term for ancient handwritten wall-inscriptions that were scratched into wall plaster. The term later came to mean any writing on a wall.

Dada was an art movement formed during the First World War in Zurich in negative reaction to the horrors of the war. The Dadaists protested through their art about the war and encouraged people to rethink their world. **Raoul Hausmann** (1886-1971) was a German Dada artist. His sculpture titled 'The Mechanical Head' shows a man who cannot think for himself but accepts everything he is told. He has a wooden head with tight lips and eyes that show no expression. The mechanical man will never argue or share his opinion.

Robert Rauschenberg (1925 –2008) was an American painter and graphic artist who also worked with photography and printmaking. Rauschenberg's belief in the power of art as a catalyst for positive social change was at the heart of his participation in a number of international projects in the 1970s. To mark the first 'Earth Day' he designed a poster built around the image of the endangered bald eagle using a collage of photographs of other endangered animals, deforestation and pollution.

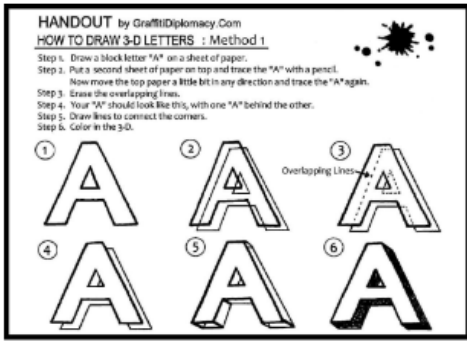
Barbara Kruger (born 1945) is an American conceptual artist. Most of her work consists of black-and-white photographs, overlaid with captions, often in white-on-red. "Your body is a battleground" was produced by Barbara Kruger for the Women's March on Washington in support of anti-abortion. In the case of abortion, the campaign for a woman's right to choose occurs outside of her **body**, yet directly affects her. This image is both art and protest.

Bob & Roberta Smith (born 1963) is in fact just one person, otherwise known as British artist Patrick Brill. His paintings look like signboards, featuring slogans in brightly coloured letters that reflect on life, politics and the role of art.

Shepard Fairey (born 1970) is an American contemporary street artist & activist. His art blurs the boundary between traditional and commercial art, in the form of prints, murals, stickers & posters. For Earth Day he has created a beautiful, blue-toned series of posters. Each piece incorporates the phrase "This Is Not A Test," referring to the urgency of actions needed to mitigate climate change and global warming. Fairey writes: *'Hopefully, you don't need to be a "nature" person to understand that this planet is the one we humans and all other species have to live on. I think anyone who appreciates natural beauty can understand why I try to use my art to highlight environmental issues.'*

Yr9 Art Cycle 3 Knowledge Organiser Page 2- Key terms and Definitions:

- **Art Activism** is a term used to describe art that is grounded in the act of campaigning to bring about political or social change.
- **Collaboration** = The action of working with someone to produce something.
- **Collage (also known as Photomontage)** = Is a technique named after the French word 'coller' meaning 'to glue'. It is a process in which pieces of paper, photographs, fabric or other ephemera are arranged and stuck down onto a surface.
- **Combine** = to unite or to join together to make a single thing or group.
- **Font:** Font is an alphabet designed so that all the letters and symbols have similar features. A font, essentially, is the lettering that graphic designers use to put text on their images and videos. A good image paired with a great font gives your work an edge and helps you to better convey your message.
- **Influence:** Influence is the ability to persuade someone to think or act differently.
  Art influences people by inspiring them. Art can influence and effects each person differently.
- **Juxtaposition**: The act of positioning close together (or side by side) to create a contrast.
  *Example: the **juxtaposition** of contrasting colours.*
- **Text Art**: Text art is a form of art that includes words or phrases, it is a combination of language and visual imagery.
- **Typography:** Typography is the art of arranging letters and text in a way that makes it legible, clear, and visually appealing when displayed. It involves font style, appearance, and structure, which aims to elicit certain emotions and convey specific messages.
- **Sculpture:** Sculpture is the art of making three-dimensional forms. **Relief** is a sculptural method in which the sculpted pieces remain attached to a solid background of the same material. To create a sculpture in relief is to give the impression that the sculpted material has been raised above the background.



Using ICT

Year 9 Video Editing Knowledge Organiser

Cheaper cameras and smart phones have made it easier than ever to be creative with audio and video. There are also many ways to edit your media using a range of different software.

Recording and sharing video

Devices commonly used to record video include:

- handheld cameras
- mobile phones
- tablets

In some cases, video needs to be copied from these devices to a computer before it can be shared on services like YouTube, Vimeo and MetaCafe. However, some devices can post video directly to these services.

Editing video

There are many video editing software packages available. Some of these include:

Adobe Premiere - **iMovie** - **Windows Movie Maker**

Video file formats

Not all devices record video in the same file format. The most common file formats are:

- **AVI**
- **MPEG**
- **MP4**
- **WMV**
- **MOV**

Online services usually convert videos into FLV files or Flash video, as most web browsers can play these files.

Shortcut Keys

Save	Ctrl+S
Play/Stop	Space
Shuttle Left	J
Shuttle Right	K
Render Effects in Work Area	Enter
Selection Tool	V
Razor Tool	C
Ripple Edit Tool	B
Ripple Trim Previous	Q
Ripple Trim Next	W
Zoom In	=
Zoom Out	-
Undo	Ctrl+Z
Copy	Ctrl+C
Cut	Ctrl+X
Paste	Ctrl+V

Watching video and listening to audio

There are many programs that support the playback of video and audio. Some of these are:

- **Windows Media Player**
- **Winamp**
- **iTunes**
- **Watching videos online**

Videos on services like YouTube, Vimeo and MetaCafe are mostly user generated. But YouTube is starting to add more professional content, eg films and music videos from studios and labels.

Movie streaming services are available. Streaming is where bits of the file are sent to you as you watch or listen. This is instead of downloading the entire file beforehand.

Watching TV online

All of the major TV channels have online catch-up services which let you watch TV that has already aired. Some of these services also let you watch live TV. These include:

BBC iPlayer (BBC) **ITV Player (ITV)** **4oD (Channel 4)** **Demand 5 (Channel 5)**

Programmes are usually only available for a limited period of time after they've aired.

Key Words

MP4
MPEG
AVI
WMV
Video
Editing
Recording
Media
Data
Software
Trim
Crop
Output
Streaming
Downloading

Common features of video editing software

Not all video editing software packages share the same features, but most let you do the following:

- create video by adding video clips, photos and music to a timeline
- add titles and special effects
- add and remove audio, eg music or voice over
- trim or crop the video - remove video from the start or end, or choose the best bit and delete the rest
- save or output a video in different file formats and at different quality settings
- Some video editing software packages let you instantly share your edited video to online services.

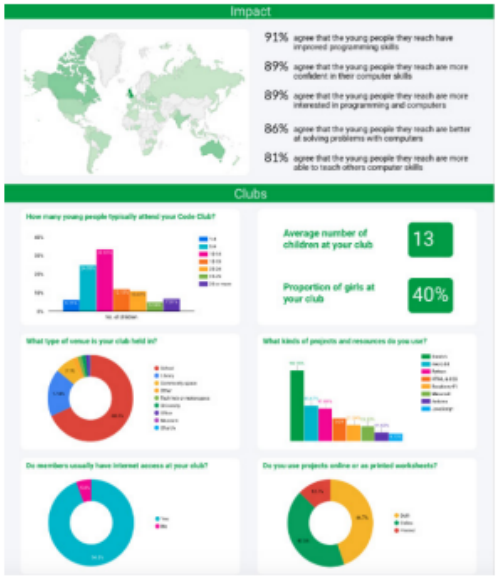
Computer Science

Year 9 - Data Science Knowledge Organiser

What is Data Science

Data science is extracting meaning from large data sets in order to gain insights to support decision-making

Infographics versus data visualisations
Data visualisations are visual representation of data (such as charts and graphs) intended to help an audience process the information more easily and get a clear idea about the data at a glance. Infographics are visual representations of data, often involving pictures that reflect patterns and help tell a story. Infographics can include visualisations.



What about anomalies?

Data that sits outside a trend is known an **outlier.**
Outliers can cause problems when working out statistics such as the mean, but they shouldn't be removed from the data set without investigating the reason for them.

Data Cleansing
Once data has been collected it should be checked through it to see if it needs cleansing. Cleansing involves detecting and correcting, or removing, corrupt or inaccurate data. There are several thinks that need to be checked when cleansing data, this will help to make sure the data set is accurate and robust.

Missing values
Is there some data missing on the data set, how would this affect the results of the research?

Duplicate entries
Duplicate data can happen when the same data has been entered twice in the dataset. This has often been entered mistakenly and will need to be removed or corrected during the data cleansing process.

Invalid data
This could be data outside the normal range that would be expected. For example if someone had their height recorded as over 3 meters tall then this would clearly be a mistake or inaccurate data. Also a persons age could be recorded as zero, this again isn't possible and would be inaccurate data and should be either corrected or removed.

Statistics

A correlation shows that there is a relationship between two or more variables. For example data could indicate a clear upwards trend, showing that there is a relationship between the two **variables**; we call that a **correlation**. This would be an example of a **positive correlation**, meaning that as one variable increases, the other one increases too.

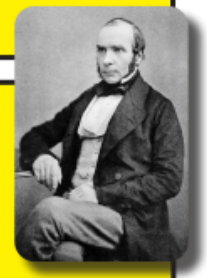
However correlation doesn't always mean causation
A **correlation** shows that there is a relationship between two or more variables, but that doesn't guarantee that one causes the other.

For example, there is likely to be a correlation between ice cream sales and the weather. Does that mean that ice cream sales cause hot weather? The correlation doesn't guarantee that one causes the other.

Key Vocabulary

Analysis
A through study doing a careful analysis of a problem.
Causation
This is when one variable influences another.
Correlation
Shows that there is a relationship between two or more variables.
Data visualisation
Representation of data with charts and graphs to help the audience process the information easily.
Infographics
Visual representations of data, often involving pictures.
Outlier
A data point on a graph or in a set of results that is very much bigger or smaller than the next data point.
Positive correlation
A relationship between two variables that tend to move in the same direction.
Variable
Something that may or does vary or change.

Jon Snows Visualisation



In 1854 there was an outbreak of cholera in the Soho area of London. At the time it was widely believed that cholera was caused by pollution in the air.

John Snow's observation of the evidence led to him discounting this belief, but he could not prove how people did become infected. John Snow made a dot map of Soho. The dots (or shaded-in parts) on the map represent where a cholera-related death had occurred. John Snow highlighted on the map the position of a water pump on Broad Street.

This data visualisation helped him to prove his theory that all the deaths had been of people who had used this water pump for drinking water. This map helped convince the local council to immediately remove the pump handle. Many lives were saved.

Year 9 – Cycle 3 – Stage Combat

Knowledge Organiser: Stage Combat Techniques

Stage Nap:

The sound that created by the human body that imitates a real sound in stage combat

Stage Punch:

The action of punching someone but not making physical contact. The action is made to look real. The nap is created by slapping the hand on the chest as you "punch" the other actor.

Stage Slap:

The action of slapping someone without making physical contact. It is made to look real. The nap is created through slapping the thigh or the hand

Stage Hair Pull:

Actor A places an empty fist on the head of Actor B. Actor B places their hand on top of A A's. The move to make it look like actor A is pulling Actor B's hair.

Stage Fall:

The art of making it look like a character has fallen or "fainted" but the actor has developed movements carefully to make it look real.

Stage Injury:

The action that makes it look like a person has been injured on stage. Actor A thrusts their hand in to Actor B's chest/ stomach. Person A grabs Actor B's hand and carefully pulls it in to their stomach to make it look like they have been injured.

Choreograph:

Creating a sequence of moves that are practiced over again. These moves are staged and not real. They are developed and made to look believable for the audience.

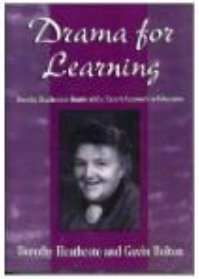
Safety:

Ensuring that no one is hurt in action. This is important when working on stage combat. An actor should never do the moves unless they are taught how to do them first.

Presentation Skills

1. Pitch
2. Project
3. Pause
4. Pronunciation
5. Pace

Advertising



Advertising
commercial products or services. You will need to become an 'expert' on some key terminology: Logo, Slogan, Brand, Product and Retail.

Dragon's Den
A television show where budding entrepreneurs, inventors and small businessmen pitch their ideas, with real cash to invest. Each contestant must convince the dragons to part with their wealth.

Mantle of the Expert
is a drama in education approach that uses imaginary contexts to generate purposeful and engaging activities for learning. Within the fiction the students are cast as a team of **'experts'** working for a **'client'** on a **'commission'.**

Year 9 – Cycle 2
Dragons Den / Advertising

The Brief – Dragon's Den

You are a shoe designer and you are being commissioned to make the shoe of the future. You are going to need to create some outstanding advertising to fulfil your clients demands. So what is advertising?

Advertising is the activity or profession of producing advertisements for
- A logo is a small icon/design that is adopted by an organisation to identify its products.
- A slogan is a short and memorable phrase used in advertising.
- A brand is a type of product manufactured by an organisation under a particular name.
- A product is a item that is manufactured or refined for sale.
- Retail is the sale of goods to the public.

You will pitch your product to the Dragons in a hope you will secure funding for your shoe production.

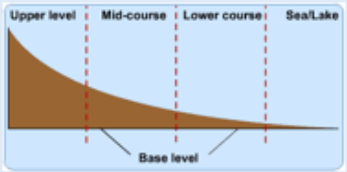
Performance Skills

Physical Skills
- Facial Expressions
- Gestures
- Posture
- Gait
- Eye Contact
- Body Language
- Proxemics

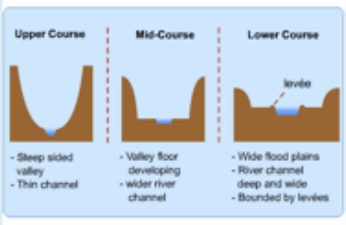
Vocal Skills
- Tone
- Pace
- Pause
- Volume
- Accent
- Emphasis
- Projection

Lesson 12: Long and Cross Profile

Long Profile of a river – diagram that shows how the gradient changes from source to mouth.



Cross Profile – shows how the river valley and channel looks at certain points in the upper, middle and lower course.



In the upper course, the river flows over a **steep gradient** from the hill/mountains. This gives the river a **lot of energy,** so it will erode the riverbed **vertically** to form narrow V-shaped valleys and interlocking spurs.

The middle course becomes less steep with a u-shaped valley , meander and oxbow lakes.

The **lower course of** the river widens further and becomes flatter. Material transported is deposited at the river end of the river- the **mouth.**

Source – where a river starts (usually in the mountains or uplands).

Main Channel – Describes the channel the river flows in.

Mouth – Describes where a river ends (usually in the sea/lake).

1. What term describes where a river starts?
2. What key term describes where a river ends?
3. What diagram shows the gradient of the river from source to mouth?
4. What are the 3 sections of a river called (NOT top, middle and bottom)?
5. What 2 characteristics are shown in the cross profiles?

Lesson 13: Interlocking Spurs and V Shaped Valleys

Vertical erosion involves the **deepening of the riverbed in the upper course.** This is mostly by hydraulic action. **Lateral erosion** erodes the **banks of the river.** This is more common in the middle and lower courses of a river.

V Shaped Valley:

1. Rivers near their source are a long way above sea level. This means they have **high gravitational potential energy**. So, they **erode** mainly downwards (**vertically**).
2. The valley sides are also **weathered**.
3. The slopes can't stay vertical because that's not stable, so the soil and rocks on the slopes slide down.
4. This makes the **V-shape** to the valley sides.

Interlocking Spurs: Outcrops of land along the river course in a valley.

1. These are **alternate hills** on each side of the valley, that stick out like the teeth of a zip in the river's path.
2. The river in the upper course **doesn't have enough energy** to erode the spurs.
3. So, the river has to **flow around the spurs** of land.

1. What type of erosion deepens the riverbed?
2. As well as erosion, what process acts upon valley sides?
3. What shape is created by steep valley sides?
4. What is an interlocking spur?
5. Why does the river flow around the spur rather than erode the spurs?

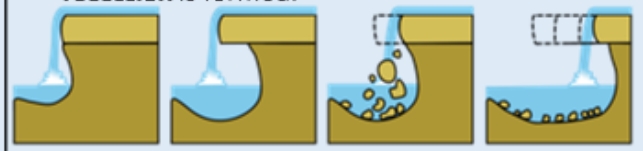
Lesson 14: Waterfalls and Gorges

Waterfall – A step in the long profile of a river usually formed when a river crosses over a hard (resistant) band of rock.

Gorge – A narrow steep sided valley – often formed as a waterfall retreats (moves back) upstream.

Waterfall formation:

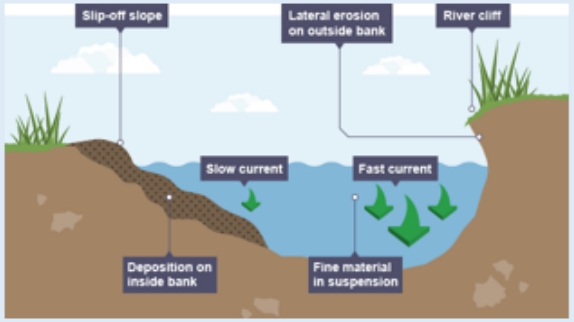
1. A waterfall forms when a river crosses a band of **hard and soft rock.**
2. The softer rock gets eroded more quickly by **abrasion** and **hydraulic action.**
3. This forms an **overhang.**
4. The erosion of the softer rock continues and **undercuts** the hard rock.
5. The hollow at the bottom is called the **plunge pool**, which is full of bits of rock from above, so there is lots of **abrasion.**
6. Eventually the **overhang collapses.**
7. The process keep going and the waterfall moves backwards (**retreats**).
8. In front of the waterfall, a steep sided **gorge of recession** is formed.



1. What 2 types of erosion are dominant in the formation of a waterfall?
2. What O forms by erosion of softer rock faster than hard rock?
3. What is the hollow at the base of a waterfall called?
4. What term describes the waterfall moving backwards?
5. What can be found in front of the waterfall?

Lesson 15: Meanders (formed by erosion and deposition)

Meanders – A wide bend or horse-shoe like loop in a river.

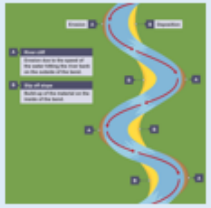


Meander Formation:

1. In the middle course the river has **lateral erosion** which widens the river channel.
2. This forms large bends and then horseshoe-like loops called **meanders.**
3. The **fastest flow (thalweg)** is on the **outside** of the meander bend. The force of the water erodes and undercuts the riverbank, forming a **river cliff**.

4. The main types of erosion are **hydraulic action** and **abrasion**.

5. On the **inside** of the bend, where the river flow is slower, material is **deposited**. A **river beach/slip off slope** forms here.



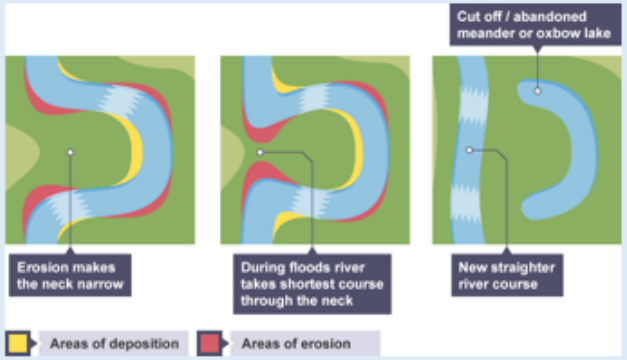
1. In what direction is erosion happening to form a meander?
2. What feature forms on the outside bend?
3. What feature forms on the inside bend?
4. What is the fastest flow called?
5. What are the 2 main types of erosion forming meanders

Lesson 15: Ox-Bow Lakes (formed by erosion and deposition)

Ox-Bow Lake – An arc-shaped lake on a floodplain formed by a cut-off meander.

Ox-Bow Lake Formation:

1. Meanders become more **sinuous** (wiggly) due to **lateral erosion.**
2. The meander becomes really tight, known as a **swans neck meander.**
3. During times of high discharge, the river erodes across the **meander neck** through **hydraulic action** and **abrasion.**
4. The river will now use the **new channel.**
5. The old meander channel is left as an **oxbow lake** due to sediment being deposited at either end.
6. Eventually the water will evaporate leaving a **meander scar.**



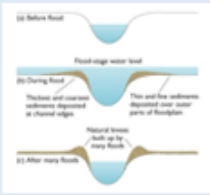
1. What term describes a meander becoming more wiggly?
2. What is a tight meander known as?
3. When does the river erode across the meander neck?
4. What process causes an ox-bow lake to be created?
5. What is formed after the water has evaporated?

Lesson 16: Depositional Landforms Flood plains and Levees

Floodplain – Relatively flat area forming the valley floor either side of a river channel that is sometimes flooded.
Levee – Raised bank found on ether side of a river, formed naturally by flooding or built to protect the area against flooding.

Floodplain Formations:

Either
Meanders migrate across the floodplain due to lateral erosion. When the reach the edge of the floodplain they erode the valley side (bluff). This explains why floodplains are very wide.
Or
When a river floods, it deposits silt, creating a very flat floodplain. Layer upon layer builds up over many years to form a thick deposit of fertile alluvium.



Levee Formation:

1. When a **river floods**, sediment (from upstream) spreads out across the floodplain. **Friction** with the land **causes deposition**.
2. When a flood occurs, the **river loses energy**. The **largest** material (sand and gravel) is **deposited first** on the sides of the riverbanks and **smaller material** (finer silt and mud) **further away**.
3. After many floods, the **sediment builds up** to increase the height of the riverbanks, so **the levées become higher** than the surrounding floodplain.

1. What key process forms floodplains and levees?
2. What causes sediment to be deposited on the floodplain?
3. What size sediment is deposited first? Why?
4. What happens to the size of the levees after each flood?
5. Give examples of smaller material that is deposited in levee formation?

Lesson 17: Estuaries

Estuary – Tidal mouth of a river where it meets the sea. Wide banks of deposited mud are exposed at low tide.

Estuary formation:

1. During a **rising tide,** the river is unable to be discharged into the sea.
2. The rivers **velocity falls** and sediment is **deposited.**
3. At low tide, these fine deposits form **extensive mud flats.**
4. These develop into **saltmarshes** and are important **habitats** for species.
5. They provide protection for boats too.

1. What happens to stop the river discharging into the sea?
2. What happens to the velocity of the river?
3. What material is deposited in the mouth of the river?
4. What provides important habitats for species?
5. When are the banks of mud exposed?

Lesson 18: River Tees

Location and Background

The River Tees is located in the north of England. The **source** of the River Tees is located in the Pennines, and it flows east 137km to its **mouth** where the river joins the North Sea.

Upper Course – Vertical erosion has formed **a V-Shaped valley. High force Waterfall** drops **21m** and is the UK's largest waterfall by volume. An area of harder rock (Whinstone) is located above a layer of softer rock (sandstone and shale). Gradually a gorge has been formed.

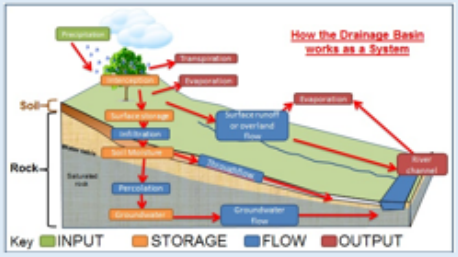
Middle Course – Features include **meanders** and ox-bow lakes due to lateral erosion. These can be found near **Barnard Castle** in the middle course. The meander near **Yarm** encloses the town.

Lower Course– Greater lateral erosion creates features such as floodplains & levees. The River Tees has a very large **estuary** with mudflats and sandbanks which supports wildlife in the area. Sites such as **Seal Sands** are protected areas.

1. Where is the River Tees located?
2. How long is the River Tees?
3. What is the name of the UK's largest waterfall?
4. What town is enclosed by a meander?
5. What is the name of the protected mudflats in the lower course?

Lesson 19: Flooding

Water Cycle and Drainage Basin Key Terms



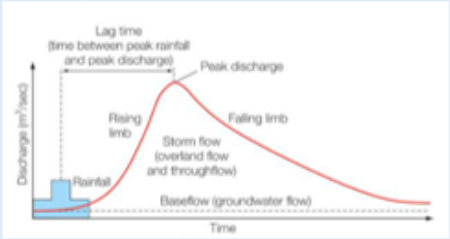
Physical Causes of flooding	Human Causes of flooding
Precipitation - Heavy rain means more water doesn't have time to infiltrate so there is more surface runoff.	**Deforestation** - When trees are removed less interception occurs, so more water reaches the river channel.
Relief (Steep slopes) - means the water doesn't have time to infiltrate. More surface runoff raises the discharge.	**Urbanisation** - Building on floodplains increases impermeable surfaces. Water can't infiltrate; flood risk rises.
Geology - Impermeable rocks (do not allow water to pass through) won't let the water infiltrate so it travels as surface runoff.	**Agriculture** - soil becomes compacted by animals and machines, water can't infiltrate. This increases if ploughing takes place.

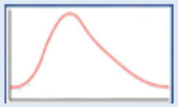
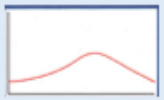
1. What input into the drainage basin is defined as rain, hail, sleet or snow falling from the atmosphere?
2. What type of rocks do not allow water to pass through?
3. What human cause of flooding means less interception?
4. What 'flow' can't take place if soil becomes compacted?
5. What 'flow' increases if there is heavy rain?

Lesson 20: Hydrographs

River discharge is the volume of water that flows in a river.

Hydrographs show how discharge at a certain point in a river changes over time in relation to rainfall.



Flashy Hydrograph	Low, flat hydrograph
Small basin size, high drainage density, impermeable rocks, urbanised areas, steep slopes, saturated soils and heavy rain all lead to rapid water transfer into the river channel and hence a flashy hydrograph with a short lag time and high peak.	Large basin sizes, low drainage density, permeable rocks, forested areas, gentle slopes, dry soils and light rain all lead to slower water transfer and hence a low, flat hydrograph with a longer lag time and low peak.
	

1. What is described as the time between peak rainfall and peak discharge?
2. What is the volume of water that flows in a river?
3. What type of hydrograph does steep slopes produce?
4. What type of hydrograph does forested areas produce?
5. Does a large basin size produce a short or longer lag time?

Lesson 21: Management

Hard Engineering	**Dams and Reservoirs** (Walls built across a river and an artificial lake).	✓ Stored water can be used for HEP X Very expensive
	Embankment (Raised riverbank on either side of the channel).	✓ Earth mounds look more natural and cheaper X They can collapse
	Flood Relief Channels (Man made river channel constructed to by-pass a town/city)	✓ Effective flood protection to urban areas. X Expensive and move flood risk downstream
	Channel Straightening (Rivers course is straightened)	✓ Water moves out of the area quickly. X Moves flood risk down river
Soft Engineering	**Flood Warnings** (Warning people through media)	✓ People are prepared therefore damage is less. X Warnings don't stop a flood.
	Flood Plain Zoning (restrictions on where to build on the floodplain)	✓ No impermeable surfaces on the floodplain. X Limits expansion of cities
	Afforestation (planting trees to intercept rain)	✓ Cheap and looks natural X Loss of grazing land
	River Restoration (return river to natural state)	✓ Increases habitats X Expensive & may lose land

1. Is channel straightening hard or soft engineering?
2. What is the benefit of dams and reservoirs?
3. What is the cost (negative) of flood relief channels?
4. What is the benefit of flood plain zoning?
5. What is the cost (negative) of river restoration?

Lesson 22: Somerset Level Floods

Background

Located in **Somerset, SW England**

250 m² of **low-lying** land

Much of the land is **reclaimed wetland** – drainage channels constructed over many centuries

Some parts **remain water-logged** all year round

Why was the scheme needed?

2014 three months of flooding. Climate change due to increase storm and flood events and increase high tides so water can't escape

1. Where are the Somerset Levels located?
2. How high is the land?
3. How long did the floods last in 2014?
4. How will climate change affect the number of floods?
5. How will climate change affect sea levels and tides? .

Geography

Lesson 22: Somerset Level Floods

Immediate River Management

- Environment Agency brought in **8 temporary pumps** form the Netherlands
- The army supplied **sandbags**
- **Artificial levees** were built of earth
- People were **evacuated** from 600 homes
- People were **evacuated** from 16 farms

Long Term River Management

- **Cost £20 million**
- **Dredged** the river so it can hold more water
- Raised **riverbanks**
- **Raised** roads and railways
- Installed new **pumping stations (21 in total)**
- Installed **flood barriers** in vulnerable communities
- A proposed new tidal barrage at Bridgewater

Issues

Economic

- **Central government does not want to** spend money **protecting farmland**
- It cost **£200 000** to **run** the **pumps for a week**.
- Total cost of current scheme is **£20 million**.

Social

- People want the river dredged but want the central **government to fund it**.

New control structures at **Beer Wall** to make sure the **A372 road does not flood**.

- The scheme will better **protect** at least **11,300 homes** and **1,500 businesses** from the risk of tidal flooding in Somerset.
- **Environmental**
  It **cost £200 000** a week to run the pumps
- Dredging the river is **extremely damaging to the environment** and has to be repeated.
- River flooding is a natural process and **creates habitats**.

1. How many pumps were brought in from Netherlands?
2. How many homes and farms were evacuated?
3. What is the cost the dredge the river?
4. What did they do to the riverbanks?
5. What is the cost of running the pumps for a week?
6. What are the negative issues with dredging the river?

Key terms

Source – where a river starts (usually in the mountains/uplands)
Main Channel – Describes the channel the river flows in
Tributary – a small stream that joins (or contributes) to the main channel
Confluence – This is where the tributary meets the man channel (the joining point)
Mouth – Describes where a river ends (usually in the sea/lake)
Drainage Basin – an area of land drained by a single river and all it's tributaries.
Watershed – the edge of a drainage basin.
Thalweg – fastest flow in the river channel. Usually on the outside bend of a meander.
Deposition - This is when a river 'drops' the sediment it is transporting in low energy environments e.g. on the inside of a meander bend.
Soft Engineering – Working with natural river processes to manage the flood risk.
Hard Engineering – Using manmade structures to prevent or control natural processes from taking place.
Flooding - when the river's discharge (volume of water) exceeds the capacity of the channel and so over-tops the banks.
Precipitation – moisture falling from the sky in the form of hail, snow, sleet or rain.
Interception – water being caught by vegetation and buildings
Stem flow – Water dripping and falling from plants
Surface Run off – Water moving over the ground
Infiltration – water soaking down into the soil
Through flow – water flowing through the soil towards the stream
Percolation – Water soaking into the bedrock
Groundwater flow – Water flowing through the saturated bedrock towards the river
Evaporation – water turning into water vapour
Evapotranspiration –water is transferred from the land to the atmosphere by evaporation and by transpiration from plants.
Geology – The study of the Earth – the rocks and rock types of which it is made.
Deforestation – The cutting down and removal of trees

History—The Cold War Knowledge Organiser

Key terms

1. Soviet Union—also known as the USSR and Russia. Was a communist country and led the eastern bloc

2. Communism—where property is publicly owned. The aim is to achieve equality in society

3. Capitalism—economic system which depends on private money and profit making. USA and the western bloc are capitalist

4. Iron Curtain—expression used by Churchill in 1946 to describe the divisions between the democratic countries in the west of Europe and the Communist countries in the east of Europe

5. The arms race—during the Cold War, the USA and USSR both built nuclear weapons to threaten each other

6. Nuclear weapons-incredibly powerful and destructive bombs

7. Containing Communism—the Americans supplied soldiers, weapons and money to countries fighting Communism

8. The Berlin Wall—wall dividing East and West Berlin, erected in 1961 and taken down in 1989

9. The Space Race—rivalry between the USA and the USSR spilled into competition for technological superiority in space

10. The Vietnam War—US war fought in Vietnam against Communist forces. The US were forced to withdraw in 1975

11. What was the Cold War?	An ongoing conflict between USA and USSR (and their respective allies) that was characterised by tension and never technically broke out into a 'hot' war. Happened between 1945-1991
12. Which two ideologies were against each other during the Cold War?	Capitalism and Communism
13. Which Eastern European countries fell under the control of the USSR?	East Germany, Poland, Czechoslovakia, Hungary, Romania, Bulgaria
14. When was the Berlin Wall first built?	August, 1961
15. What was the Cuban Missile Crisis of 1962 about?	The USSR put nuclear missiles on the island of Cuba, only 90 miles away from the USA. The crisis was over whether this would result in nuclear war. The USSR removed them.
16. Why was the Space Race important in the Cold War?	It was thought it could mean weapons being used in space. It indicated the success and prestige of either the USA/USSR
17. What was the Domino Theory?	The fear that if one country 'fell' to communism, the neighbouring countries would also fall
18. Why did the USA get involved in the Vietnam War?	Fear of the Domino Theory; The French were defeated A communist (Ho Chi Minh) had taken over North Vietnam; Vietnam was divided; Growth of communist guerrilla fighters (Viet Cong); South Vietnam's leader (Diem) was unpopular.
19. Why did the USA lose in Vietnam?	Inexperienced soldiers; Viet Cong tactics were successful; US tactics (such as bombing and Search & Destroy) not working; US public opinion turned against the war
20. Why did the Cold War end?	Communism was not as successful as capitalism economically; USSR economy couldn't keep up with USA; New Soviet leader (Gorbachev) introduced reforms that eventually meant Eastern European countries gained independence and the USSR broke up into different states.

Knowledge organiser - Cycle 3 – The Civil Rights Movement

Overview: With the end of the American Civil War in 1865, Abraham Lincoln made slavery illegal. This did not end the racist attitudes that existed, especially in the southern states where they used to enslave people. Black people's rights were initially denied them by the **Jim Crow Laws** that enforced **segregation**, and then by the continuing racist attitudes. Big advances came in the 1950s and 60s with important changes made, however racism continues to be a problem, as shown by events such as the **George Floyd** murder in 2020

Timeline of key events

Date	Event
1861-65	American Civil War – **slavery** made illegal at the end
May 1954	Brown Vs Board of Education court ruling – said that **segregation** in schools was illegal and had to end.
25th Aug 1955	Murder of **Emmett Till**
1st Dec 1955	**Rosa Parks** bus protest – led to the **boycott** of buses
4th Sep 1957	Little Rock Nine – Nine students including Elizabeth Eckford become the first black students to be **integrated** into a formerly segregated school.
28th Aug 1963	March on Washington '**I have a dream**' speech.
2nd July 1964	**Civil Rights** Act signed – gave black and white citizens legal equality.
4th April 1968	**Martin Luther King** assassinated
11th April 1968	**Civil Rights** Act signed by President Johnson – helped end differences in housing for black and white families.
15th July 2013	#BlackLivesMatter used for the first time on twitter
2020	Murder of **George Floyd** sparks the Black Lives Matter protests across the world.

Key terms

Key Word	Definition
slavery	The state of being enslaved (not free)
abolition	To bring something to an end
segregation	The system that kept black and white people separate in the southern states of USA
boycott	Refusing to use a service or buy from a shop/business as a way of protesting. E.g. The bus **boycotts** – people refused to travel by bus so the company lost money.
civil rights	The rights of citizens to social and political equality
civil disobedience	Breaking the laws that you disagree with on purpose as a way of protesting.
integration	Ending **segregation** – allowing black people to mix freely. E.g. ending separate schools for black and white children.
lynching	The brutal, public murders of black people by white mobs (large groups). This was often done by hanging from trees.
Jim Crow Laws	The laws that made **segregation** legal in the southern states of the USA
Ku Klux Klan	**White supremacist** group who used violence and murder to intimidate African Americans.
white supremacy	The belief that white people are better than black people.

Important people

Emmet Till 	14-year-old who was lynched in 1955 after being accused of offending a white woman.	**Elizabeth Eckford** 	One of the Little Rock Nine – a group of nine students who when to a formerly segregated school. A famous photo of Eckford shows white protesters screaming abuse at her
Rosa Parks 	American activist in the civil rights movement renowned for sparking the bus boycott. She refused to give up her seat for a white passenger	**Malcom X** 	A key civil rights leader. He influenced the Black Panthers, a group who were prepared to use violence to gain **civil rights** for African Americans
Martin Luther King Jr 	Spokesperson and leader in the civil rights movement from 1955 until his assassination in 1968. Gave the famous '**I have a dream**' speech	**George Floyd** 	An African American, murdered by a US policeman in 2020 during his arrest. His death and the trial of the policeman that followed caused a worldwide focus on fighting racism

9 Fr LC3 Sentence Builder 1 : School rules : Quelles sont les règles ? Tu es d'accord ?

Noun	verb	verb phrase	opinion	adjective	connective	reason
Au collège en Angleterre (at school in England)	je dois (I have to) on doit (one has to) il faut (it's necessary to)	écouter le professeur (listen to the teacher) être gentil(le) (be kind) travailler en classe (work in lessons) être à l'heure (be on time) porter l'uniforme (wear a uniform) faire mes devoirs (do my homework)	je trouve ça (I find that)	juste (fair) normal (normal) facile (easy)	car (because)	il faut protéger les jeunes (it's necessary to protect young people) il faut respecter les autres (it's necessary to respect others) je veux apprendre (I want to learn) je veux des bonnes notes (I want good marks/grades)
	_____	_____		_____		_____
	je ne dois pas (I must not) on ne doit pas (one must not) il est interdit de/d' (it is forbidden to)	utiliser un portable (use a mobile phone) porter des bijoux (wear jewellery) crier dans les couloirs (shout in the corridors) harceler d'autres élèves (bully other students) tricher dans un contrôle (cheat in a test)		injuste (unfair) frustrant (frustrating) ridicule (ridiculous) énervant (annoying)		on n'est pas des bébés (we are not babies) mon prof a téléphoné à mes parents (my teacher phoned my parents) j'ai eu une heure de retenue (I had an hour of detention) c'est trop strict (it's too strict)

Y9Fr LC3 SB2 – What do you like to wear? Qu'est-ce que tu aimes porter ?

Noun	verb	noun	adjective	opinion phrase	verb	adjective		
Au collège À l'école (At school)	je porte (I wear) on porte (we wear) je dois porter (I have to wear) on doit porter (one has to wear)	une chemise (a shirt) une veste (a jacket) une jupe (a skirt) une cravate (a tie)	noire (black) bleue (blue) verte (green) grise (grey) blanche (white)	selon moi l'uniforme (in my opinion the uniform) je trouve que l'uniforme (I find that the uniform)	est (is)	très pratique (very practical) trop cher (too expensive) un peu moche (a bit ugly) assez confortable (quite comfortable)		
								
Hier (yesterday) Le weekend dernier (last weekend)	j'ai porté (I wore)	un pantalon (trousers) un pull (a jumper) un manteau (a coat) un jean (jeans) un chapeau (hat) un haut (a top)	rouge (red) jaune (yellow) noir (black) bleu (blue) vert (green) gris (grey) blanc(white)	car j'aime (because I like) car je préfère (because I prefer)	le style (the style) les vêtements (clothes)	sportif (sporty) relaxe (relaxed) courant (up to date) confortables (comfortable) intéressants (interesting) pratiques (practical) aux couleurs vives (colourful)		

Y9 LC3 Sentence builder 3 : Languages & travel – Tu apprends une langue ?

Time marker	verb	noun	opinion	reason	future tense	noun	clause
 Au collège (at school) En ce moment (At the moment) Actuellement (Currently)	j'apprends (I'm learning)	le français (French) l'allemand German) l'espagnol (Spanish) le grec (Greek) l'italien (Italian) le chinois (Chinese) l'arabe (Arabic)	je pense que c'est important (I think it's important)	car dans le futur (because in the future) car après avoir fini mes études (because after having finished my studies)	je vais faire une année sabbatique (I'm going to do a gap year) je vais avoir une carrière (I'm going to have a career) je vais étudier (I'm going to study) je vais voyager (I'm going to travel) je vais faire du bénévolat (I'm going to do volunteering) je vais faire une formation (I'm going to do some training) je vais faire un échange scolaire (I'm going to do a school exchange) je vais habiter (I'm going to live) je vais enseigner l'anglais (I'm going to teach English je vais aider les gens (I'm going to help people) je vais soutenir un projet (I'm going to support a project)	en Asie (In Asia) en Europe (in Europe) en Afrique (in Africa) à l'étranger (abroad) au Canada (in Canada) en Amérique du Sud (In South America) en Grèce en France en Italie en Espagne en Allemagne (Greece France Italy Spain Germany)	seule(e) (alone) avec ma copine (with my friend) avec mon copain (with my friend) avec ma famille (with my family)
Un jour (one day A l'avenir (in the future)	je voudrais apprendre (I would like to learn)						

Y9Fr LC3 SB4 – My future trip - ordering and booking – Je peux vous aider?

Future time marker	future tense	connective	noun	connective	future verb phrase
L'année prochaine (Next year) L'été prochain (Next summer)	je vais aller en France (I'm going to go to France) je vais aller au Canada (I'm going to go to Canada)	avec (with	ma famille (my family) mes amis (my friends) mon école (my school)	pour (to/for) _____ je vais (I'm going to	améliorer mon français (improve my French) _____ rester dans un hôtel (stay in a hotel) manger dans un restaurant (eat in a restaurant)

Greeting/question	conditional	noun	question	noun	please	price
 Bonjour, je peux vous aider ? (Hello, can I help you?) 	Je voudrais (I would like)	l'entrée (the starter) le plat du jour (dish of the day) la viande (the meat) le poulet (the chicken) le poisson (the fish) les legumes (the vegetables) la salade (the salad)	et comme boisson? (and as drink?) et comme dessert? (and as dessert?)	un coca (a coca cola) de l'eau (water) du thé (tea) du café (coffee) la mousse (the mousse) la tarte (the tart) les fruits (the fruit) la glace (the ice cream) le gâteau (the cake)	s'il vous plaît.	ça fait ___ euros, merci et au revoir. that's __ euros, thanks and goodbye.
	Je voudrais une chambre (I would like a room)	avec un grand lit (with a double bed) avec un lit simple (with a single bed) pour une personne (for one person) pour deux personnes (for two people) avec une vue sur la mer (with a sea view) avec une salle de bains (with a bathroom)	Pour combien de nuits? (For how many nights ?)	pour __ nuits s'il vous plaît. (for __ nights please.)		

Year 9 Learning Cycle 3 Sentence Builder 1: Barcelona

Place	Verb	Article	Noun	Adjective	Connective	Verb	Location
Barcelona	es = is no es = is not era = was no era = was not será = will be no será = will not be	una =a	ciudad = city	animada = lively antigua = old bonita = pretty caliente =hot económica = cheap enorme = enormous fea= ugly fresca = fresh/ cool fría = cold histórica = historical ideal = ideal industrial = industrial limpia = clean moderna = modern nueva = new peligrosa = dangerous pobre = poor práctica = practical pura = pure seca = dry social = social sucia = dirty tranquila = peaceful vacía = vacant verde = green mejor (que) = better than peor (que) = worse than NB. All adjectives are feminine to agree with ciudad	y = and pero = but	está en = is (located) in está situada en = is situtated in está cerca de = is near to está lejos de = is far from	España = Spain Cataluña = Catalonia el aire libre = open air la costa = the coast el norte = the north el sur = the south el oeste = the west el este = the east

Year 9 Learning Cycle 3 Sentence Builder 2: Costa Rica

Verb	Place	Connective	Verb	Noun	C'tive	Verb	Verb
Me encanta = I love Me gusta = I like Odio = I hate	Costa Rica	porque = because	hay = there is/are no hay = there isn't/ aren't	un aeropuerto = an airport animales = animals bosques = forests/woods un buen clima = a good climate delitos = crimes desarollo = development desastres = disasters espacios verdes = green spaces hospitales = hospitals jardines = gardens lagos = lakes mercados = markets un metro = an underground montes = hills museos = mountains paisaje = landscape pájaros = birds paro = unemployment parques = parks parques nacionales = national parks peligros =dangers pueblos = town/villages puertos = ports restaurantes = restaurants ríos = rivers ruidos = noises silencio = silence tráfico = traffic transporte público = public transport	donde = where	puedo = I can se puede = you can me gusta = I like to	bailar = to dance beber = to drink caminar = to walk comer = to eat descansar = to rest jugar = to play leer = to read montar = to ride nadar = to swim pasear = to go for a walk pintar = to paint viajar = to travel pasarlo bien = to have a good time
Me gustaría visitar = I'd like to visit Me gustaría ir a = I'd like to go to Quiero visitar = I want to visit Quiero ir a = I want to go to Voy a visitar = I 'm going to visit Voy a ir a = I'm going to go to			hace = it does	calor = heat sol = sun			

Year 9 Learning Cycle 3 Sentence Builder 3: Imaginary reflection

Time phrase	Verb	Place		Verb	Connective		
el año pasado = last year el verano pasado = last summer la primavera pasada = last spring	visité = I visited	Barcelona, Costa Rica,	lo mejor = the best lo peor = the worst	era = was	cuando = when		bailé = I danced bebí = I drank caminé = I walked comí = I ate compré = I bought descansé = I rested me divertí = I had fun jugué = I played leí = I read monté = I rode nadé = I swam paseé = went for a walk pinté = I painted probe = I tried me quemé = I got sunburnt tomé el sol = I sunbathed fui de compras = I went shopping di un paseo = I went for a stroll
					que= that	había = there was	arena blanca = white sand arquitectura = architecture aventuras = adventures café = coffee castillos = castles fiestas = parties fruta = fruit islas bonitas = pretty islands montañas = mountains piscinas = swimming pools playas = beaches pobreza = poverty tiendas = shops vistas = views

Year 9 Learning Cycle 3 Sentence Builder 4: Future travel

Time Phrase	Verb		C'tive
En el futuro = In the future Antes de trabajar = Before working Antes de la universidad = Before the university Después de estudiar = After studying Después del colegio = After the school Para un año sabático = For a gap year	voy a = I am going quiero = I want quisiera = I'd like espero = I hope sueño con = I dream of	aprender a conducir = to learn to drive aprender a tocar la guitarra = to learn to play the guitar aprender otro idioma = to learn another language ayudar en mi comunidad = to help in my community ayudar un proyecto medioambiental = to help an environmental project beber vino = to drink wine cruzar fronteras = to cross borders enseñar inglés = to teach English ganar dinero = to earn money hacer un viaje por tren por Europa = to do a train journey through Europe practicar mi español = to practice my Spanish ser turista = to be a tourist trabajar como voluntari = to work as a volunteer viajar con mochila = to travel as a backpacker viajar el mundo = to travel the world visitar Latinoamérica = to visit Latin America	porque parece = because it looks

Step 1: Choose your project

Solo performance	Group performance	Original composition	Remix	Musical research	Music article/review	Music podcast	Something else?

Step 2: Desribe your project

Explain your project	Why have you chosen this project?	What music careers could this be useful for?

Step 3: Resources and personel

Who will you be working with?	What equipment will you need?

Step 4: Plan

You will have 8 lessons to complete this project - how will you use them?	e.g. Writing one review will not take 8 hours, so why not write 2 articles and an album review for the same music magazine?

Step 5: Teacher approval

This project has been approved / not approved by:	Signed:_____

Step 6: Independant work

This is all up to you!

Step 7: Present your work

Everyone will share your work with the class.	You could record a performance, perform live, or just stand up and present the work you have created.

Step 8: Reflection

What went well?	What could be improved?

Year 9 Cycle 3 Sport and PE Knowledge Organiser

EDUCATION SOUTH WEST

Week 1 and 2	Week 3 and 4	Week 5 and 6	Week 7 and 8	Week 9 and 10	Week 11 & 12
Groups who participate in Sport	Barriers to Participation	Solutions to Barriers	Values Promoted through Sport	The Olympic and Paralympic Creed & Values	Conduct of Performers
1.Children 2.Teenagers 3.Single Parents 4.Families with young children 5.Disabled 6.Retired people/over 50 7.Ethnic minorities 8.Working singles/Couples 9.Unemployed/Economically disadvantaged  	1.Family commitments 2.Lack of money/disposable income 3.Lack of time/work commitments 4.Gender –perception that boys & girls don't do certain sports 5.Influence of peers/family 6.Lack of role models 7.Low self esteem 8.Provision and awareness of activities 9.Accessibility to facilities 10.Lack of transport 	**PROMOTION (advertise it)** •Targeted promotion (e.g. social media) •Using role models to encourage participation among different user groups •Initiatives aimed at promoting participation and inclusion **PROVISION (what to put on and when)** •Programme sessions for use by different user groups •Providing appropriate activities for user groups •Planning of times to suit different user groups **ACCESS (Can people get to it)** •Access to FACILITIES (e.g. transport if in country side or wheelchair ramps for disabled) •Access to equipment (e.g. a hoist for swimming pool access) •Sensible Pricing (e.g. reduction of charges for unemployed people or young children)	1.**Team Spirit** –learning how to work together and support others 2.**Fair Play** –learning the importance of adhering to rules and being fair 3.**Citizenship**–get involved in your local community 4.**Tolerance & Respect** – developing understanding of different countries and cultures through sport 5.**Inclusion**-initiatives to get under-represented social groups involved 6.**National Pride** – supporters and performers unite behind the country in international events 7.**Excellence**-striving to be the best you can be	 The creed and motto are meant to **inspire the athletes to embrace** the Olympic spirit and inspire them to perform to the best of their ability. The vision is 'To enable Paralympic athletes to achieve sporting excellence and inspire and excite the world. ' "*The important thing in life is not the triumph, but the fight; the essential thing is not to have won, but to have fought well.*" 	**ETIQUETTE**- Are the unwritten rules of a sport/activity, they are not enforced but usually observed & shows a level of respect & fairness for the sport & opponent e.g. acknowledging to your opponent if your shot hit the net and still went over so you win the point **SPORTSMANSHIP**- Is conforming to the rules, spirit & etiquette of a sport e.g. shaking hands with an opponent, being gracious in winning or losing. **GAMESMANSHIP**-Is the attempt to gain an advantage by stretching the rules to their limit e.g. timewasting, diving in football

My PE Targets

Cycle 1	Knowledge Organiser score:	Emerging	Developing	Secure	Mastery
My Target:					
Cycle 2	**Knowledge Organiser score:**	**Emerging**	**Developing**	**Secure**	**Mastery**
My Target:					
Cycle 3	**Knowledge Organiser score:**	**Emerging**	**Developing**	**Secure**	**Mastery**
My Target					

How to make a SMART target in PE

- Read the assessment band that you have been awarded
- Self-assess the most important area for you to develop out of Head, Heart and Hands
- Choose one bullet point from the band above that you are going to try and focus on in the next cycle

Examples of Targets

- This cycle I am going to try and work with different students in my group
- To demonstrate respect to others I am going to focus on listening when they are talking
- To show resilience even when practices get more challenging
- To improve my cardiovascular fitness by attending fitness suite club
- To improve my skill level by attending Badminton club

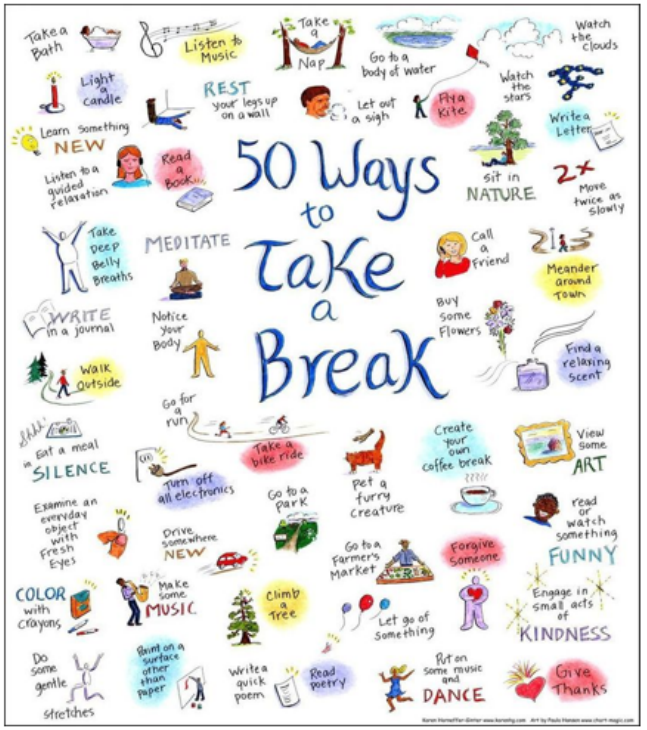
PSHE: How can I look after my well- being?

Key terms:

Mental health		**This refers to how we feel, how well we're coping with daily life or what feels possible at the moment.**
Good mental health		Having good **emotional** and **mental** health is when we are in control of our thoughts, feelings, and behaviour. We are able to cope with life's challenges, and we mostly feel good about ourselves and have good relationships with others.
Mental health		Relating to the mind
Physical		Relating to the body as opposed to the mind.
Emotions		These are also called **feelings.** They can be affected by situations and our relationships with others
Healthy coping strategy		Good things we can do to help us to manage our most intense, thoughts and emotions.

Take a break: do something you enjoy

Try to plan some activities that you enjoy and which will take your mind off things, whether that's texting or face-timing a friend, watching a film, reading a book or going for a walk.



PSHE: How we can we look after our well-being?

Support at school

- Your tutor
- Your Raising Standards Lead
- Your Inclusion Lead
- Your PSHE teacher / PSHE team including Mrs Joyce
- Ms Ray and Miss Lee (in charge of safeguarding)
- Any teacher

Peer led student support:
•Your 6th from Mental Health Ambassador
•Your 6th form student leaders – email Mrs Joyce

Wellbeing support at lunchtime:
•Monday break 2 in RE3– see the well-being mentors drop in for a chat, advice, or just come and spend some time in a relaxed, safe environment
•Thursday break 2 Equality and Diversity group
•Just Dance in the hall Friday Break 2

There are lots of places to get advice and support online.

ChildLine:
www.childline.org.uk Phone: 0800 1111

Young Minds:
www.youngminds.org.uk

Samaritans:
www.samaritans.org Phone: 116 123

In a crisis, text 'Shout' to 85258

5 minute mental wellbeing actions

These are simple, free actions you can do daily.
Many take very little time or energy, and most can be done in less than five minutes.

- **Breathe – take a few deep breaths**
- **Have a glass of water**
- **Have a healthy snack**
- **Do a 5 minute burst of exercise**
- **Connect with someone you care about – give them a hug, send them a message**
- **Take a moment to be still and present**

EH4MH EARLY HELP 4 MENTAL HEALTH

'10 a day' choices towards balancing our mental health

RE: "To what extent should we use medical technology?"

1 - Key Terms - week 1 & 5.

Sanctity of life	the belief that life is precious, or sacred. For many religious believers, only human life holds this special status,
Quality of life	the extent to which life is meaningful and pleasurable
Value of life	the things that you believe are important in the way you live and work.
Fertility treatment	any treatment or medical procedure intended to increase the likelihood of a person successfully conceiving a child.
IVF	(in vitro fertilisation): when sperm and an egg are put together in a tube until an embryo is formed which is then transferred into a woman's womb.
AID	artificial insemination by donor.
AIH	artificial insemination by husband.
Soul	the spiritual aspect of a being; that which connects someone to God. The soul is often regarded as nonphysical and as living on after physical death, in an afterlife.
Abortion	the deliberate expulsion of the foetus from the uterus. Sometimes called a 'procured' or 'direct' abortion.

2. Key terms - week 2 & 6.

Doctrine of double effect	if doing something morally good has a morally bad side-effect, if it is right to do it providing the bad side-effect is not intended.
Ectopic pregnancy	when a foetus starts to grow in a Fallopian tube rather than the womb.
Miscarriage	when a baby is aborted through natural causes. Sometimes called a spontaneous abortion.
Cloning	the making of a replica.
Reproductive cloning	cloning which creates offspring.
Stem cells	single cells which have the potential to be 'reprogrammed' to develop into any type of cell in the body.
Therapeutic cloning	a medical procedure where single cells are taken from a person or embryo and 'reprogrammed' to create stem cells which can be used in medical treatment.

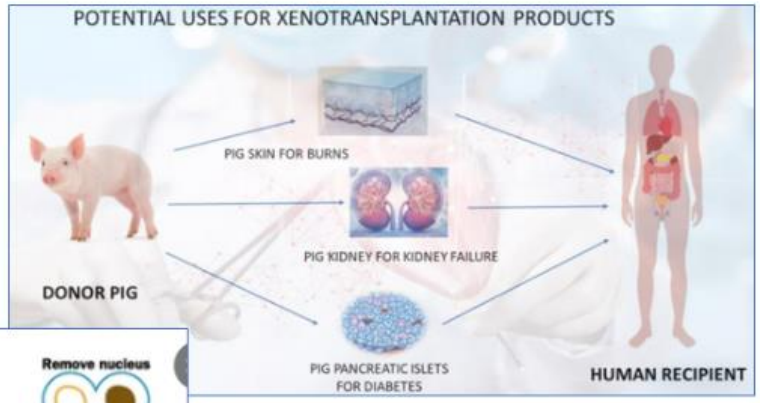
3. Key Terms - week 3 & 7.

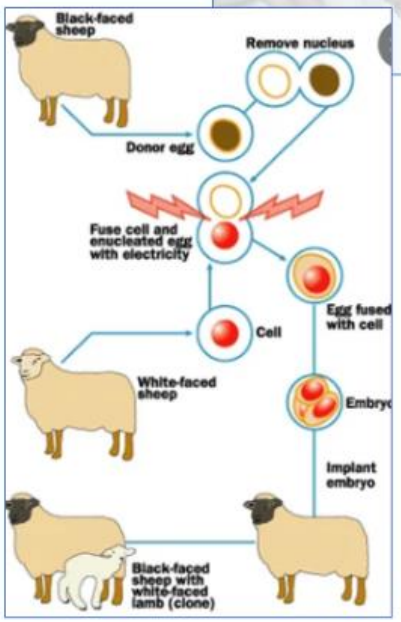
Sin	an act which goes against God's wishes.
Suffering	physical, mental or spiritual pain.
Euthanasia:	from Greek, eu 'good' + thanatos 'death'. Sometimes referred to as 'mercy killing. The act of killing or permitting the death of a person who is suffering from a serious illness.
Hospice	a place where terminally-ill patients are cared for.
Palliative care	care given to a terminally ill patient to help them to die in as much comfort as possible.
Dominion	authority or rule.
Medical research	scientific experiments carried out to help cure disease
Stewardship	looking after something for someone else.
Surrogacy	when a woman carries and gives birth to a baby for another person or couple.
Human genetic engineering	the process of using recombinant DNA (rDNA) technology to alter the genetic makeup of an organism.
Saviour Siblings	A child conceived through selective in vitro fertilization as a potential source of donor organs or cells for an existing brother or sister with a life-threatening medical condition.

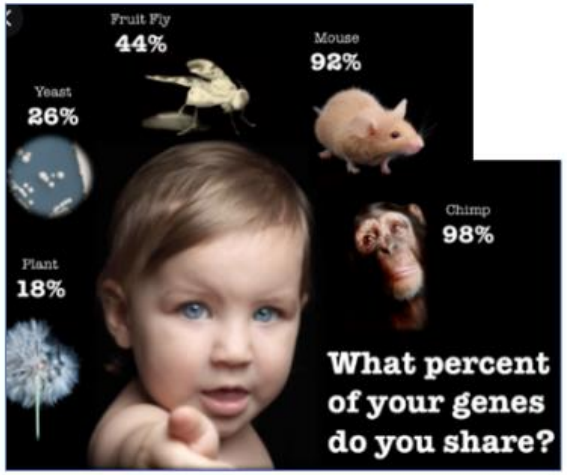
RE: "To what extent should we use medical technology?"

Key Terms – week 4 & 8.

Designer babies	a baby whose genetic make-up has been selected in order to eradicate a particular defect, or to ensure that a particular gene is present.
Embryology	the branch of biology and medicine concerned with the study of embryos and their development.
Blood transfusion	A procedure in which whole blood or parts of blood are put into a patient's bloodstream through a vein. The blood may be donated by another person or it may have been taken from the patient and stored until needed.
Transplant surgery	A surgical procedure in which tissue or an organ is transferred from one area of a person's body to another area, or from one person (the donor) to another person (the recipient).
Xenotransplantation	Any procedure that involves the transplantation, implantation or infusion into a human recipient of either (a) live cells, tissues, or organs from a nonhuman animal source, or (b) human body fluids, cells, tissues or organs that have had ex vivo contact with live nonhuman animal cells, tissues or organs.
Human experimentation	testing drugs on humans







Knowledge Organiser

100 °C **Boiling Water**
bacteria will be destroyed

75 °C **Cooking/Reheating**

63 °C **Minimum Hot Holding**

37 °C **Body Temperature**
ideal temperature for bacteria to grow

8 °C **Food Storage**
store food at this temperature or below

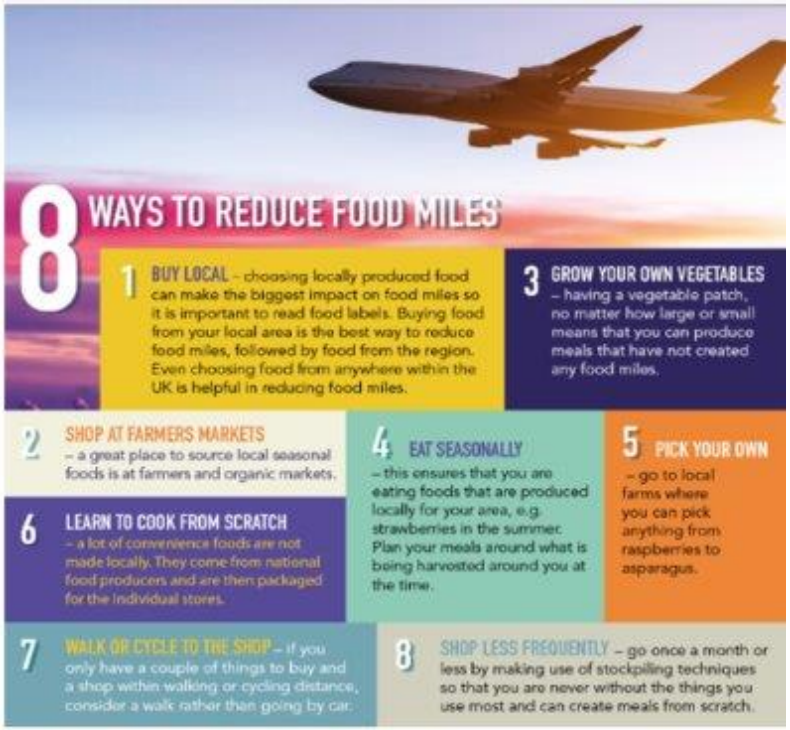
5 °C **Fridge Temperature**

-18 °C **Freezer Temperature**
bacteria won't grow but may not die

All the above temperatures are guidelines only

The concept of food miles also includes the waste generated from the product, which must be transported from a home to a landfill site. The average household throws away more than three kilograms of food and 14 kilograms of food packaging per week. Buying food with as little packaging as possible and composting organic waste can also make a difference.

Pathogenic bacterium	Where it is found	Typical symptoms	Average onset time
Campylobacter	Raw poultry, meat, milk, sewage	Abdominal pain, diarrhoea (bloody), nausea, fever	48-60 hours
Salmonella	Intestines of humans and animals Raw poultry and meat eggs, milk	Abdominal pain, diarrhoea, nausea, vomiting	12-36 hours
Staphylococcus A	Humans – skin, hair, nose, mouth, throat, cuts, spots	Abdominal pain/cramps, vomiting, chills	1-6 hours
E. coli 0157	Human and animal sewage, water, raw meat, muddy vegetables	Abdominal pain, fever, diarrhoea, vomiting, kidney damage/failure	12-24 hours



Food miles

Food miles are the distance that food travels from field to plate. The means of transport, as well as the distance, is an important consideration when choosing which foods to buy. For example a longer journey by boat has less environmental impact than a shorter one by road.

Carbon footprint

Food miles also lead us to consider the **carbon footprint** of a product. This involves looking at the entire production chain, including all the processes involved in the product's creation and transportation, to calculate the total emissions of carbon dioxide and other greenhouse gases that it is responsible for.

If we choose to buy products that are grown and produced in the UK, it is possible to reduce the amount of unnecessary food miles. However this is not always the case; reports show that even though it reduces food miles, it is less environmentally friendly to grow tomatoes in the UK under glass than it is to import tomatoes from Spain. The reason for this is that Spain's warm climate does not require heated glass houses, meaning the energy used in transporting tomatoes from Spain is less than the energy it would take to heat glass houses for growing tomatoes in the UK.

Ways to reduce food waste

There are many ways that consumers can minimise the amount of food waste they produce.

- Plan your food shopping - this helps to avoid buying food already in the house, or being tempted to buy too much.
- Store food in the correct place at the correct temperature – a cool cupboard, the fridge or the freezer – to avoid it going off prematurely.
- Be waste-free by using up leftovers, for example in soups and smoothies.
- Understand the difference between 'use-by' and 'best before' dates. Food that is eaten after the 'best before' date will not be of such good quality but will not be harmful to eat.
- Compost food that cannot be eaten such as vegetable peelings and teabags.

Cross-contamination

Bacteria have neither wings nor legs and cannot move from one food or surface to another. They need a 'vehicle' for this which is usually a human, insect or animal. For example, if someone uses the same knife to cut raw chicken then without washing it cuts cheese for a sandwich, the pathogenic bacteria will be transferred from the raw chicken to the cheese. This is called **cross-contamination**.

How to prevent cross-contamination

There are a number of precautions that need to be observed to prevent cross-contamination of food.

A pest infestation must be dealt with immediately.

Even domestic animals present a risk. Pets such as cats and dogs can bring pathogenic bacteria into the home, so always wash your hands after touching your pet.

To reproduce, bacteria need to be given ideal conditions which are →

Given ideal conditions, bacteria will reproduce through **binary fission** where one bacterium splits into two bacteria, two into four, four into eight and so on every 10 to 20 minutes. Binary fission will happen more quickly in warm foods and high risk foods left in a warm area. Some bacteria, classed as **anaerobic** bacteria, are able to reproduce without the presence of oxygen.

LACTOSE INTOLERANCE

Lactose intolerance means that the person must avoid cow milk. This can be replaced with other milks such as hazel, hemp, almond, rice or soya milk. Lactose-free products such as cheese are also available.

People with lactose intolerance cannot digest the milk sugar, lactose, because of an enzyme deficiency in the body. The body digests lactose using a substance called lactase to break down lactose into two sugars called glucose and galactose which can then be easily absorbed into the bloodstream. People with lactose intolerance do not produce enough lactase, so lactose stays in the digestive system where it is fermented by bacteria, leading to the production of various gases, causing the symptoms associated with lactose intolerance.

Many processed foods contain lactose. Lactose intolerant people should read the labels to check.

COELIAC DISEASE

Coeliac disease is triggered by gluten (a collective term for protein found in cereals, wheat, rye and barley) and causes the body's immune system to attack its own tissues.

Foods that are naturally gluten-free such as rice, corn, maize, potato, buckwheat, polenta, soya and millet can be made into flours which can be used in gluten-free dishes.

All types of plain meat, fish, eggs, cheese, milk, most yoghurts, fruits, vegetables and pulses (peas, beans and lentils) are also naturally gluten-free and can be eaten freely on a gluten-free diet.

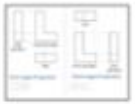
Foods such as bread, biscuits, cakes, couscous and pastas must be avoided.

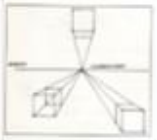
Gluten can also be found in custard powders, thickening starch, some cheese spreads and sauces.

Gluten-free products are widely available and their packaging carries a special symbol.

REASON FOR COOKING

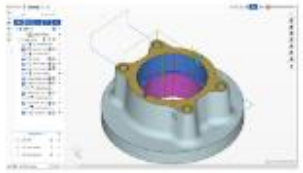
- To kill **pathogenic bacteria** and toxins making the food safe to eat
- To soften the food making it easier to chew and swallow
- To make the food more digestible
- It improves and intensifies the flavour of food
- The food looks more attractive and appealing
- It reduces the 'bulk' of the food
- Provides variety to our meals
- To enable certain ingredients to work together
- We eat hot food to keep warm in cold weather

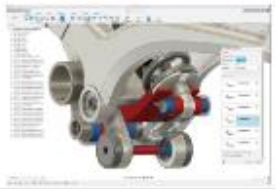
Communication techniques.		Examples
What is an orthographic drawing?	Orthographic projection is used to show detail and measurements of the product clearly from a range of angles so that a stranger could use the drawing to work out the shape and dimensions for manufacture. A furniture designer would be a perfect example of someone who may use orthographic projection. To create an orthographic projection, you draw the front view, side view and plan view of your product in 2D. You can either draw them out by hand or generate the views using various CAD programs.	
What is an exploded view?	Are an effective way of demonstrating what is inside a product. These enable designers to think about the materials, the components and the way that the product is assembled. Exploded views show how the product would look if it were to be disassembled. You often find exploded views in the drawings that make up a patent.	
What is an assembly drawing?	These are used by designers to inform manufacturers and customers about how to assemble a product correctly. IKEA uses assembly drawings in their instructions for flat pack furniture. The drawings show how parts fit together, which components go where. Parts are often numbered and named with dimensioned detail drawings.	

Communication techniques.		Examples
What perspective drawing?	Perspective drawings tend to look more realistic than both oblique and isometric techniques, as they visualise objects in a very similar way to our eyes. There are two types of perspective drawing: one-point perspective and two point perspective.	
What is 1 point perspective drawing?	One point perspective is a drawing method that shows how things appear to get smaller as they get further away, converging towards a single 'vanishing point' on the horizon line. It is a way of drawing objects upon a flat piece of paper (or other drawing surface) so that they look three-dimensional and realistic.	
What is 2 point perspective drawing?	Two-point perspective - This shows an object from the side with two vanishing points. It gives the most realistic view of a product as it shows the item edge on, as we would see it. It is often used to produce realistic drawings of an object.	

Communication techniques.		Examples
What is Freehand sketching?	Often used by designers in the generation of their initial ideas. Freehand sketching is an effective way of quickly getting your ideas either in 2D or 3D from your head onto paper. Further along the process, the freehand sketches can be developed in more depth often with a different technique.	
What is isometric drawing?	Isometric drawing Isometric drawing is way of presenting designs or drawings of a 3D object. They are used by architects and engineers to communicate their ideas to the client and manufacturer, showing the product or design to scale. **In order for a design to appear three dimensional, a 30 degree angle is applied to its sides.**	
What is oblique drawing?	**Oblique projection** is a simple type of technical drawing of graphical projection used for producing two-dimensional (2D) images of three-dimensional (3D) objects. The objects are not in perspective and so do not correspond to any view of an object that can be obtained in practice, but the technique yields somewhat convincing and useful. Oblique projection is commonly used in technical drawing. **In order for a design to appear three dimensional, a 45 degree angle is applied to its sides.**	

The use of computer aided design and computer aided manufacture.	
What is CAD?	Computer aided design (CAD) is the use of computer software to design new products in 3D. This enables businesses to visualise new designs in a variety of materials and send images around the world for collaboration and consultation. Once production is finalised, these designs are sent to computer aided manufacture (CAM) machines to be formed.
What is CAM?	Computer aided manufacture (CAM) involves using computers to control machines to undertake the production of goods. By using CAM, designs can be sent to CAM machines such as **laser cutters, 3D printers and milling machines.**
What are the advantages of CAD?	• Ideas can be drawn and developed quickly • Designs can be viewed from all angles and with a range of materials • Some testing and consumer feedback can be done before costly production takes place • It becomes easier to design and test a range of ideas
What are the disadvantages of CAD?	• Expensive to set up • Difficult to keep up with constantly changing and improving technology • Computers can fail
What CAD programmes do we use in school?	2D Design and Autodesk fusion 360

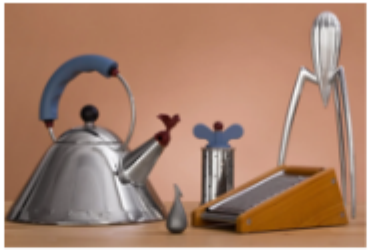




Who is Alessi?

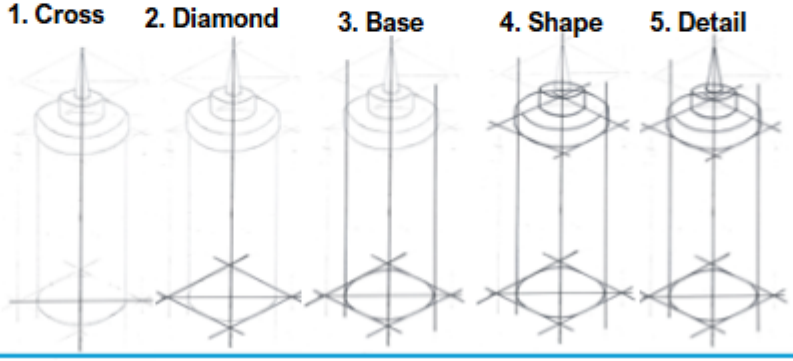
Founded in 1921, Italian brand Alessi is committed to making the ordinary extraordinary. Known for elevating everyday objects from fruit bowls to corkscrews, their designs are instantly recognisable.

From what started as a metalwork factory, Alessi is infamously known for their innovative homeware designs. Designers and architects around the world take everyday objects and turn them into a hybrid of functional art.

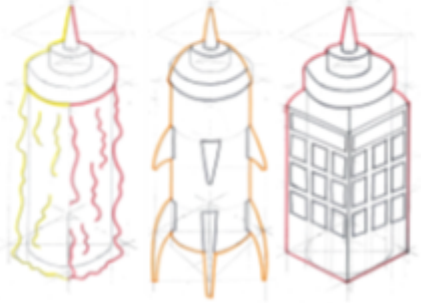


3D Illustration Stepped Support

Consider the basic 3D forms (shapes) of your object, then break it down into individual shapes using guidelines for accuracy. Example: Use the guideline progression steps below to sketch the basic outline.



Example Product Design Outcomes



Keywords:

Hybridization

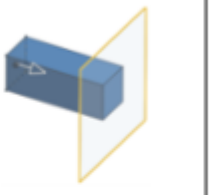
Definition
What is the meaning?
*The combination of **art** and **functionality** to create an innovative product*

Word Family
Words with a similar meaning
- *Combination*
- *Remix*
- *Fusion*
- *Blend*
- *Mixture*

Examples
Products with this design approach...
Alessi Products:
- *Bunny & Carrot paper towel holder*
- *Caricature bottle openers*
- *Boat butter dish*
- *Magic bunny toothpick*

Digging Deeper
Why is hybridisation used in design?
To give products a unique selling point.

Extrude



Definition
What is the meaning?
The process of stretching a flat, 2D shape vertically to create a 3D shape

Word Family
Words with a similar meaning
- *Force out*
- *Eject*
- *Release*
- *Express*

Examples
Name a 3D design computer software
- *Fusion 360*
- *OnShape*
- *Sketchup*
- *Autodesk*

Digging Deeper
Why is 3D computer design used within product development?
Designers can view and edit the design easily prior to physical prototyping, which can save time and money.

Ergonomics

Ergonomics is the science of **designing products so they are comfortable for people to use and interact with**. It's all about making sure that anything we physically interact with fit the person using them as well as possible.

EXAMPLE – An ergonomically design tool handle is shaped to the contours of your hand, so that it is easy and comfortable to grip.

EXAMPLE – An ergonomically design chair supports your back and helps you sit properly, so you don't get sore after sitting for a long time.

Polymorph

Polymorph is a **thermoforming plastic that softens at 62°.** It is easy to bend and form but cools hard to mimic a plastic product. It is very effective for creating 3D models of products, which you can then test for e.g. how ergonomic they are.

Inclusive design

Inclusive design means creating things (like buildings, websites, or products) so that **everyone can use them easily, no matter their age, ability, or background**. It's about designers thinking ahead to include people who might have disabilities or other challenges, so no one feels left out.

EXAMPLE – An inclusively designed playground has ramps and swings for kids who use wheelchairs.

EXAMPLE – An inclusively designed website that lets you change the text size or colours to help people with vision issues read it.

Inclusive design helps make the world fairer and easier for everyone to enjoy and interact with. Products that are design inclusively can lead to products that are easier to use by everyone:

EXAMPLE – A single lever tap does not require you to grip or twist it in order to turn it on or adjust the temperature. This means a simple push with your hand, elbow or even chin will enable you to operate it.

Empathetic Design

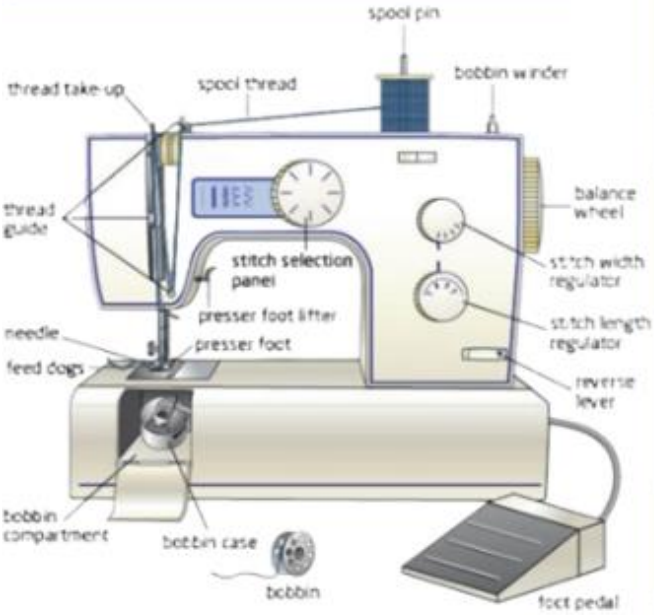
Empathy means understanding and sharing how someone else feels, like imagining what it's like to be in their situation. Therefore, **empathetic design** means putting yourself in someone else's shoes before you create something, so it helps solve their problems or makes their life easier.

Designers will **talk to and observe people** using current products or going about the daily lives, to understand as best they can the issues, struggles and difficulties people have.

However, to help them experience first-hand the difficulties people may have, designers can use **specialist tools that help simulate certain conditions or stages of life.**

EXAMPLE – Gloves that help simulate the reduction of hand movement associated with arthritis.

Anatomy of a Sewing Machine



How to thread a Sewing Machine

TEXTILES KEYWORDS	DEFINITION
Thread Tension	The amount of thread that can pass through the machine to create the stitch
Stitch Length	The length of one stitch
Spool	A reel on which thread is wound round, which sits on top of the machine. It assists the lower thread by making stitches on the top side of the fabric.
Bobbin	A reel on which thread is wound round, which sits under the needle. It assists the upper thread by making stitches on the bottom side of the fabric.
Presser Foot	an attachment used with sewing machines to hold fabric flat as it is fed through the machine and stitched
Reverse Lever	When pressed, the machine can sew backwards. A back stitch is used to secure the thread at the end of a point or corner.
Balance Wheel	Allows you to move the needle up and down. Useful for threading the needle.
Fabric Interfacing	Interfacing is a textile used on the unseen or "wrong" side of fabrics to make an area of a garment more rigid.
Seam Allowance	The area between the fabric edge and the line of stitches. Doing this ensures that you cut out all of the pattern pieces large enough so that when they are stitched together they fit perfectly.