A blue dashed border surrounds the entire page, consisting of short horizontal and vertical segments.

Fowey River Academy  
Year 11 Knowledge Organiser

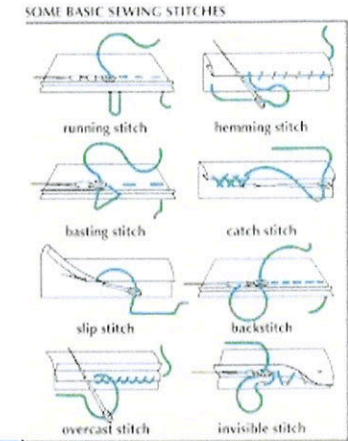
Autumn Quadmester



# YEAR 11 TEXTILES

## PORTFOLIO - HUMAN/ BOTANICAL/ ARCHITECTURE

Every page needs to be full, interested and annotated. Explore a wide variety of media in your research and idea development.



### TEXTILES TECHNIQUES

- Fabric Painting
- Batik
- Silk Painting
- Tie Dye
- Embroidery
- Applique
- Reverse Applique
- Felt Making
- Quilting
- Weaving
- Printing
- Fabric Manipulation

### Annotations:

- What have you done?
- Why have you done it?
- What do you think of it?
- Where was your inspiration from?
- How did you make it?
- Which artists inspired you?
- Where would you make changes?
- What might it be like in different media?

### AO1

Develop ideas based on research

To annotate artist research, demonstrate that you understand what influenced the artist.

To show the journey of your sketchbook is influenced by artists/designer.

### AO2

To explore a variety of materials and processes.

To refine techniques used in your sketchbook to show that you are getting better at new processes!

To adapt and improve outcomes based on written evaluations.

### AO3

To record ideas, intentions and observations that link to your intention for your project.

To produce beautiful observational drawings consistently through your sketchbook

### AO4

To create an outcome that is personal, skillful and linked to the theme in a meaningful way

To show that you are able to create an outcome as a result of clear planning in your sketchbook.



# YEAR 11 PHOTOGRAPHY

## Portfolio- Reflections

Formal elements in Photography:

LINE      FORM/SHAPE  
 PATTERN      TONE  
 COLOUR      TEXTURE  
 SPACE

### Experimentation techniques

Weaving  
 Re arranging  
 Burning  
 Scratching/  
 ripping  
 Sewing into  
 Drawing over  
 Painting over  
 Digital layering  
 Digital editing  
 (Hue/ Contrast/  
 Exposure)

### How do I...Annotate my contact sheet?

**A03**

#### Your Opinions

Circle or highlight your favourite photographs on your contact sheet  
 Cross or highlight your least favourite photographs  
 On your circled and crossed photos explain why you have identified these as the best / worst

#### Crop Lines

Draw on to your contact sheet to show where you would like to crop your subject matter/composition

#### Techniques

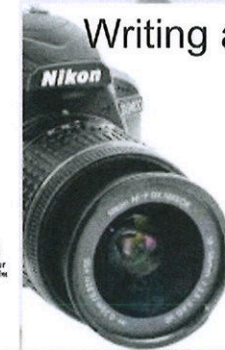
Note down any composition rules, effects and lighting methods used in your images

#### Camera Settings

Using the right click and get info method find out the shutter speed, F stop, ISO, white balance... Note these next to your thumbnails and say why these settings were used and evaluate the success



### Writing about your own photos:



- Say what you have taken a photo of.
- Talk about where you took the photo.
- Discuss what composition rules you used.
- Discuss the lighting in the photograph.
- Explain how you have changed/ manipulated the photo.
- Find a photo by another photographer and explain how they are similar/ different.
- Say what you find most successful about your photo.
- Explain what you would do next to improve that photo.

### A01

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### A02

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# YEAR 11 ART

## PORTFOLIO - NATURE/DISTORTED PORTRAITS/ CLOSE UP



### KEY MISCONCEPTIONS ABOUT EXPERIMENTING

**That you only have to do one page of experimenting**

You need to include at least 3 pages of experimentation

**That annotation does not have to be in full sentences**

All written work must be high quality analysis and use the framework sheets to organise your annotation

**That you only have to come up with one idea for an outcome**

You must plan, test, review and adapt your outcome idea. It should go through three phases of improvement.

**Refine means trying lots of different things once**

You must show that you have developed a small selection of skills confidently to create work that is more complex

**That you can copy an existing artwork for your final outcome.**

Your artwork must be based on photographs that you have taken and inspired by a combination of both artist styles.

### EXTENSION TASKS

**AO2** Scan your work. Crop it and create a repeated pattern on Powerpoint

**AO2** Make a screen print using your artist as inspiration.

**AO2/AO3** Select an artwork from your book and recreate using a different material

**AO1/AO4** Annotate your work focusing on how your experiments have helped you form an idea

**AO1/AO2** Link your project to an historical event and integrate text into your artwork.

**AO2** Combine two of your artworks on Photoshop through layering and adjusting transparency.

**AO2/AO3** Zoom in on one of your drawings and create an abstract artwork.

**AO3/AO1** Take more photos to work from. Print out and annotate.

**AO2** Use a photo to make a monoprint. Work into it with paint/colour pencil/watercolour/fabric/collage.

**AO3** Produce a beautiful tonal drawing based on a photograph.

### How to successfully analyse an artwork

Use **key terminology** to describe the composition  
Identify all **elements of art** in the artwork and explain its impact on the artwork.  
What materials did the artist use and how did they use it  
Who was the artist inspired by?  
What do you like about the artwork?  
What made you choose this artist and how have they influenced you?

### AO1

Develop ideas based on research

To annotate artist research, demonstrate that you understand what influenced the artist

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# Inheritance, Variation and Evolution Knowledge Organiser

## Keywords

**allele** – An alternative form of a gene.

**asexual reproduction** – The production of offspring from a single parent by mitosis. The offspring are clones of the parent.

**chromosome** – Structures that contain the DNA of an organism and are found in the nucleus.

**cystic fibrosis** – A disorder of cell membranes that is caused by a recessive allele.

**DNA** – A polymer that is made up of two strands that form a double helix.

**dominant** – An allele that is always expressed, even if only one copy is present.

**fertilisation** – The fusion of male and female gametes.

**gamete** – Sperm cell and egg cell in animals; pollen and egg cell in plants.

**gene** – A small section of DNA that codes for a specific protein.

**genome** – The entire genetic material of an organism.

**genotype** – The combination of alleles.

**heterozygous** – A genotype that has two different alleles, one dominant and one recessive.

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**meiosis** – The two-stage process of cell division that reduces the chromosome number of the daughter cells. It makes gametes for sexual reproduction.

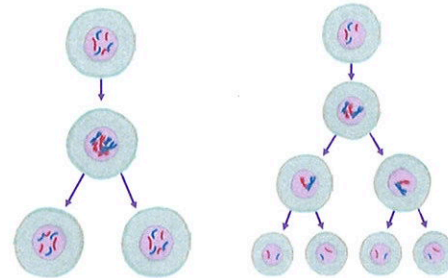
**mutation** – A change in DNA.

**phenotype** – The characteristic expressed because of the combination of alleles.

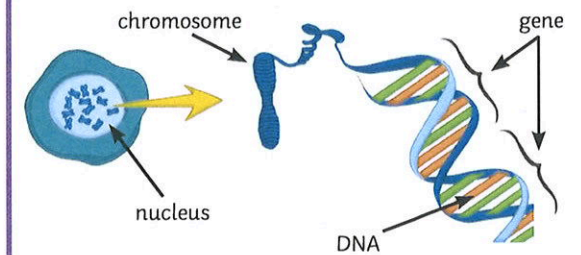
**polydactyly** – Having extra fingers or toes. It is caused by a dominant allele.

**recessive** – An allele that is only expressed if two copies of it are present.

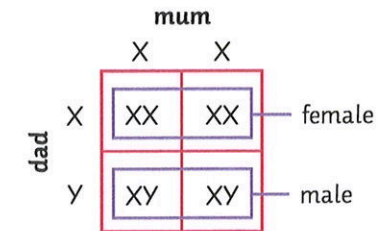
**sexual reproduction** – The production of offspring by combining genetic information from the gametes of two parents. Leads to variation in the offspring.



Mitosis	Meiosis
Produces two daughter cells.	Produces four daughter cells.
Daughter cells are genetically identical.	Daughter cells are not genetically identical.
The cell divides once.	The cell divides twice.
The chromosome number of the daughter cells is the same as the parent cells. In humans, this is 46 chromosomes.	The chromosome number is reduced by half. In humans, this is 23 chromosomes.
Used for growth and repair, and asexual reproduction.	Produces gametes for sexual reproduction.

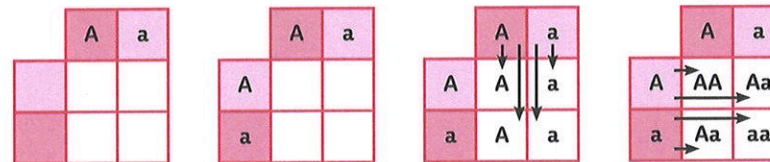


## Sex Determination



Females carry two X chromosomes.  
Males carry one X and one Y chromosome.

## How to Complete a Punnet Square



### Step 1:

Put the two alleles from one parent into the boxes at the top. This parent is a heterozygote. This means they have one dominant and one recessive allele.

### Step 2:

Put the two alleles from the second parent into the boxes on the left. This parent is also a heterozygote.

### Step 3:

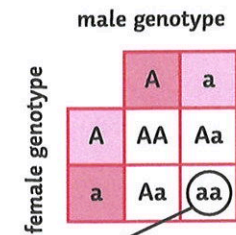
Put the alleles from the first parent into the two boxes underneath them.

### Step 4:

Put the alleles from the second parent into the two boxes to the right of them.

## Probability

There are four possible combinations of gametes that offspring can inherit.



One of these four has the genotype aa – that's  $\frac{1}{4}$ , 25% or 0.25.

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**selective breeding** – Humans selecting animals or plants, that have a required characteristic, for breeding.

**speciation** – The process by which two species evolve from a single original species by natural selection. The two populations have become so different that they can no longer interbreed to produce fertile offspring.

**variation** - Differences in characteristics of individuals in a population.

## Variation

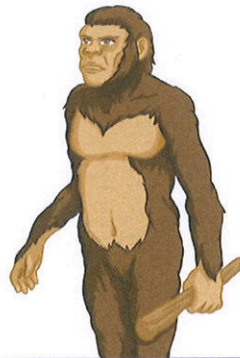
Variation maybe be due to differences in:

- the genes that have been inherited (genetic causes);
- the conditions in which they have developed (environmental causes);
- a combination of genes and the environment.

## Evolution

All species of living things have evolved from simple life forms by natural selection.

- If a variant/characteristic is advantageous in an environment, then the individual will be better able to compete.
- This means they are more likely to survive and reproduce.
- Their offspring will inherit the advantageous allele.



## Fossils

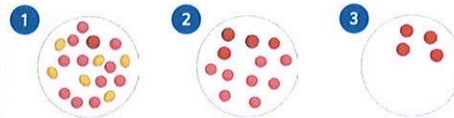
Fossils could be:

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Many early life forms were soft-bodied so have left few traces behind.

Fossils help us understand how much or little organisms have changed as life developed on earth.

## Resistant Bacteria



1 There is variation in the bacterial population. One bacterium develops a mutation by chance that means it is resistant to an antibiotic.

2 The antibiotic kills some of the bacteria, the resistant bacterium survives and reproduces.

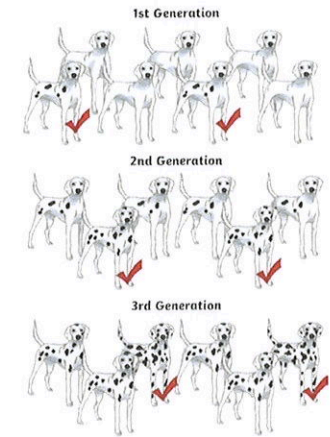
3 The antibiotic kills the rest of the non-resistant bacteria so the person may start to feel a little better. The resistant bacterium has survived the antibiotic and continues to multiply.

To reduce the rate at which antibiotic-resistant strains appear:

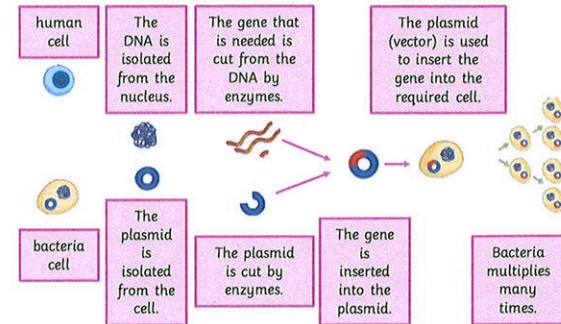
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## Selective Breeding

1. Choose parents who have the desired characteristic.
2. Select the best offspring and breed these to make the next generation.
3. These offspring are then bred again and again, over many generations, until a desired result is achieved.



## Genetic Engineering



## Classification

Linnaeus classified living things into kingdom, phylum, class, order, family, genus and species.

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Due to evidence from chemical analysis, there is now a 'three-domain system' developed by Carl Woese.

<b>Domain</b>	bacteria	archaea	eukaryota			
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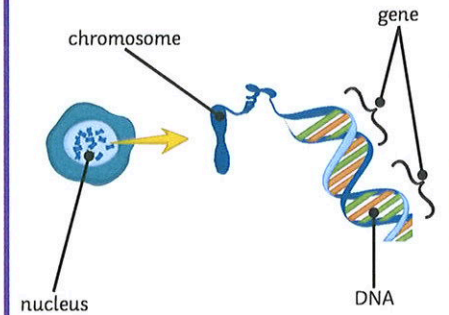
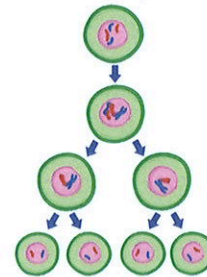
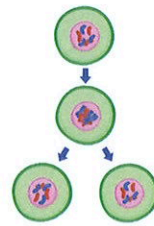
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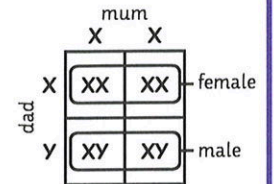
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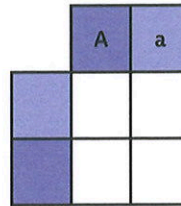
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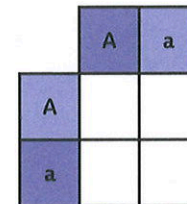


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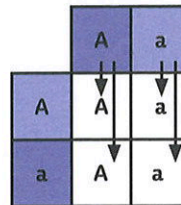
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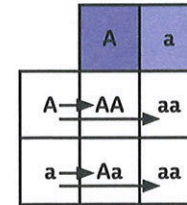
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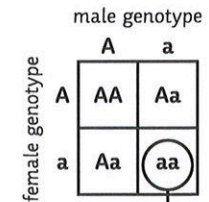


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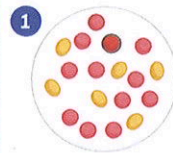
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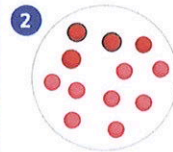
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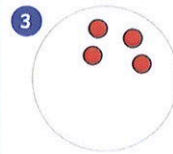
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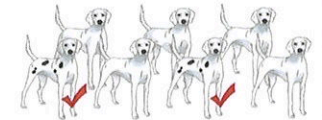
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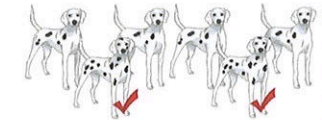
## Selective Breeding

- Choose parents who have the desired characteristic.
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- These offspring are then bred again and again, over many generations, until a desired result is achieved.

1st Generation



2nd Generation



3rd Generation



## Genetic Engineering

human cell



The DNA is isolated from the nucleus.

bacteria cell



The plasmid is isolated from the cell.

The gene that is needed is cut from the DNA by enzymes.



The plasmid is cut by enzymes.

The plasmid (vector) is used to insert the gene into the required cell.

The gene is inserted into the plasmid.

Bacteria multiplies many times.

## Classification

Linnaeus classified living things into kingdom, phylum, class, order, family, genus and species.

Organisms are named by the binomial system of genus and species.

Due to evidence from chemical analysis, there is now a 'three-domain system' developed by Carl Woese.

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# AQA Inheritance, Variation and Evolution Knowledge Organiser

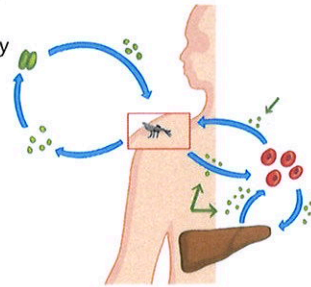
## Advantages of sexual reproduction:

- Produces variation in the offspring;
- If the environment changes, variation gives a survival advantage via natural selection;
- Natural selection can be increased by humans in selective breeding to increase food production.

## Advantages of asexual reproduction:

- Only one parent needed;
- More time and energy efficient as they do not need to find a mate;
- Faster than sexual reproduction;
- Many identical offspring can be produced when conditions are favourable.

Malarial parasites reproduce asexually in the human host but sexually in the mosquito.



Many fungi reproduce asexually by spores, but also reproduce sexually to give variation.

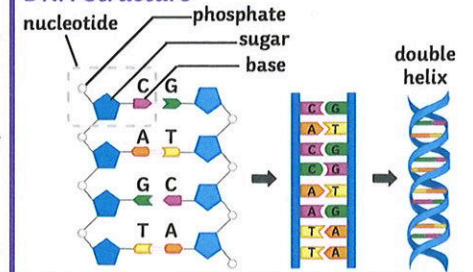


## Evolution by Natural Selection

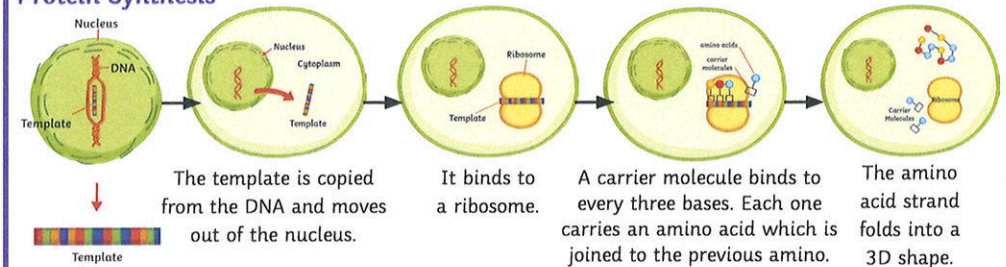
Darwin's theory was only gradually accepted because...

- the theory challenged the idea that God made all the animals and plants that live on earth.
- there was insufficient evidence at the time the theory was published to convince many scientists.
- the mechanism of inheritance and variation was not known until 50 years after the theory was published.

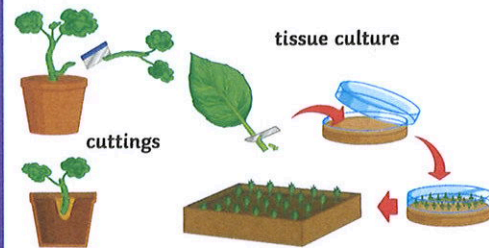
## DNA Structure



## Protein Synthesis



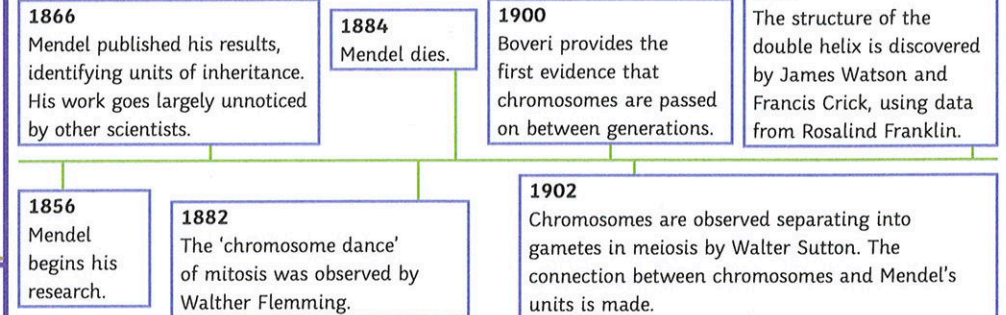
## Cloning in Plants



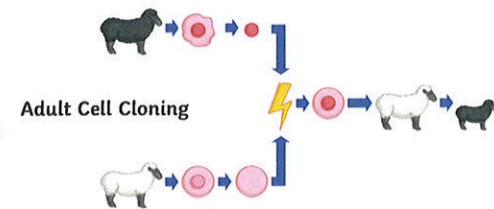
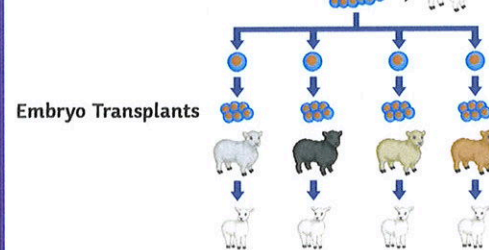
Many plants produce seeds sexually, but also reproduce asexually by runners such as strawberry plants, or bulb division such as daffodils.



## The Understanding of Genetics



## Cloning in Animals



## Speciation

- isolation** – Parts of a population become geographically or environmentally isolated from each other.
- conditions** – If the conditions in each environment are different, then different characteristics will be advantageous.
- natural selection** – Organisms with this characteristic are more likely to survive and pass on the allele for it to their offspring.
- speciation** – Eventually, the two populations are so different they can no longer interbreed to produce fertile offspring.

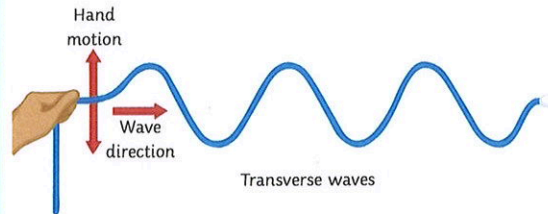




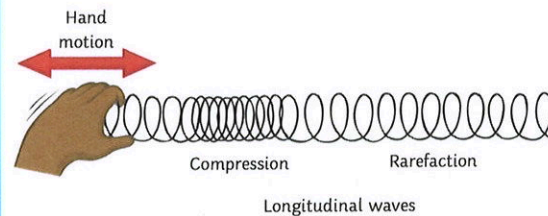
**Transverse and Longitudinal Waves**

Waves can be either **transverse** or **longitudinal**.

In a transverse wave, the vibrations are at a right angle (**perpendicular**) to the direction of the energy transfer. The wave has **peaks** (or **crests**) and **troughs**. Examples include **water waves** and **light waves**.

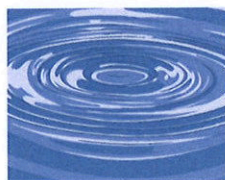


In a longitudinal wave, the vibrations are in the same direction (**parallel**) as the energy transfer. The wave has areas of **compression** and **rarefaction**. Examples of this type of wave are **sound waves**.

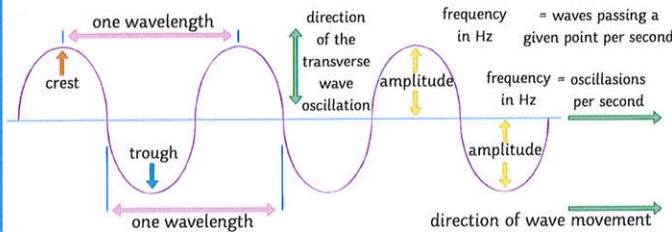


When a wave travels, energy is transferred but the matter itself does not move. Particles of water or air vibrate and transfer energy but do not move with the wave.

This can be shown by placing a cork in a tank of water and generating ripples across the surface. The cork will bob up and down on the **oscillations** of the wave but will not travel across the tank.



**Properties of Waves**



The **frequency** of a wave is the number of waves which pass a given point every second.

$$\text{time period (s)} = 1 \div \text{frequency (Hz)}$$

$$t = 1 \div f$$

The **wave speed** is how quickly the energy is transferred through a medium (how quickly the wave travels).

$$\text{wave speed (m/s)} = \text{frequency (Hz)} \times \text{wavelength (m)}$$

$$v = f \times \lambda$$

The speed of **sound waves** travelling through air can be measured by a simple method. One person stands a measured distance from a large flat wall, e.g. 100m. The person then claps and another person measures the time taken to hear the echo. The speed of the sound can then be calculated using the equation

$$\text{speed} = \text{distance} \times \text{time.}$$

Remember the distance will be double because the wave has travelled to the wall and back again. It is important to take several measurements and calculate the average to reduce the likelihood of human error.

**Sound Waves in Different Medium**

How quickly sound waves can travel through a medium is determined by the **density** of the medium (material).

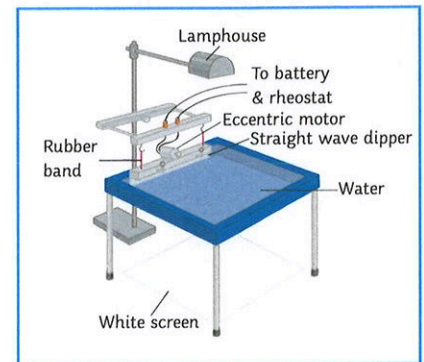
Sound waves will travel faster through a solid than a liquid as the spaces between the particles are smaller. This means that the **vibrations** and **energy** can be passed along the particles more quickly. In a gas, the transmission of sound is even slower as the space between the particles is greater.

The speed of sound in air is 330m/s.

**Required Practical Investigation 8**

Aim: make observations and identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid, and take appropriate measurements.

The **ripple tank apparatus** shown is the most commonly used for this investigation. It is likely you will work in groups or observe the investigation as a demonstration by your teacher.



**Method** (assuming the apparatus is already set-up):

Turn on the power and observe the waves. Make any necessary adjustments to the equipment so that the waves are clear to observe (alter the voltage supplying the motor). **N.B. The lowest frequency setting on the motor will ensure that the waves measurements can be made more easily.**

To measure the **wavelength**, use the metre ruler and make an estimate quickly. You may want to use a **stroboscope** and freeze the wave patterns to make measurements.

**Record 10 wavelengths** and calculate the **average** value.



## Required Practical Investigation 8 (continued)

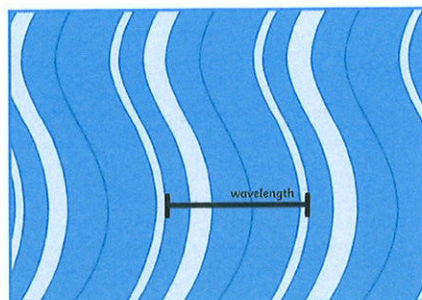
To measure the wave **frequency**, mark a given point onto the white paper and **count** the number of waves which pass the point within **10 seconds**. Divide your answer by 10 to find the number of **waves per second**.

**Record 10 frequencies** and calculate the **average** value.

To calculate the wave speed, use this formula:

$$\text{speed} = \text{frequency} \times \text{wavelength}$$

**Remember: the wavelength is the distance between one peak (or crest) of a wave and the next peak.**



## Required Practical Investigation 9

**Aim:** investigate the reflection of light by different types of surface and the refraction of light by different substances.

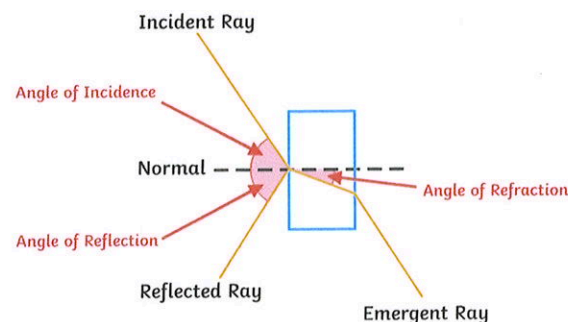
**Method:**

1. In a darkened room, set up the ray box on a flat surface and insert the filter to produce a single ray of light.
2. Place a glass block in the centre of a piece of plain A3 paper.
3. Draw a line around the glass block.
4. Draw a line at 90° to the glass block and label the line normal, as shown in the diagram.
5. Position the ray box so the ray of light hits the glass at an angle.
6. Using a pencil, draw the incidence, reflected and emergent rays as shown in the diagram.
7. Remove the glass block and draw the refracted ray going through the block.

8. Using a protractor, measure the angles of incidence, reflection and refraction. Record your results.
9. Repeat the experiment by placing a clear acrylic block on the A3 paper in the same position as the glass block.
10. The incident ray must follow the same line as before. Draw the reflected and refracted rays and measure using a protractor.
11. Collect four sets of results from other members of the class.

The law of reflection states:

$$\text{angle of incidence} = \text{angle of reflection}$$



**Risk assessment:**

The ray box will become hot during use and may cause minor burns. To prevent this, you should not touch the lamp and ensure you allow time for the ray box to cool after use.

You will be working in a semi-dark environment which means there is a higher risk of trips or falls. You should ensure your working space is clear of bags and coats, and that stools are tucked under desks before you start your investigation.

## Required Practical Investigation 10

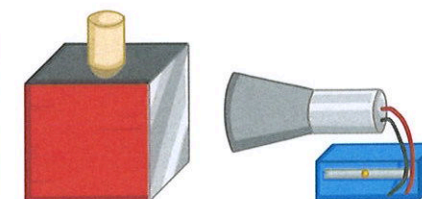
**Aim:** investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.

In this investigation, you are finding out which type of surface emits the most **infrared** radiation:

- **dark and matt**
- **dark and shiny**
- **light and matt**
- **light and shiny**

**Method:**

1. Place the **Leslie cube** on a heatproof mat.
2. Once the kettle has boiled, fill the Leslie cube with hot water.
3. Ensuring that the **thermometer** or the **infrared detector** is an **equal distance** from each of the surfaces (in turn) on the Leslie cube, measure the amount of infrared radiation emitted.
4. Repeat the experiment twice more to collect three results for each surface.



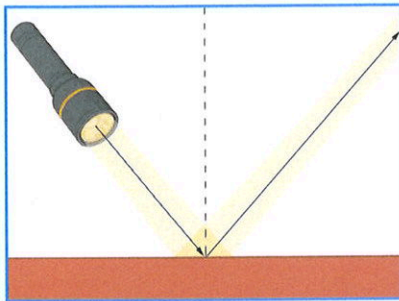


**Reflection of Waves**

When a **wave** comes into contact with a **surface** or a **boundary** between two media (different materials), it can be **reflected** or it can be **absorbed**.

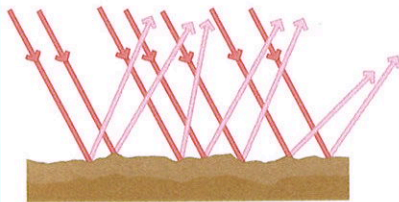
What happens depends on the properties of the surface the wave hits.

**Specular reflection** occurs when a wave is reflected in a **single direction** from a perfectly **smooth surface**.

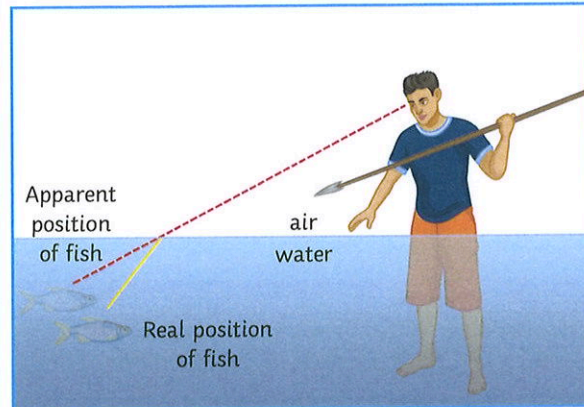


**angle of incidence = angle of reflection (i = r)**

**Diffuse reflection** occurs when a wave is reflected in **many directions** and happens at a rough or **uneven surface**.



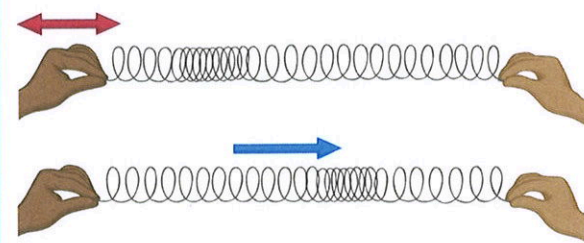
**Refraction** occurs when a wave **changes direction**, usually at the boundary or two different materials. The **density** of the material affects the **speed** at which the wave can travel through it. When a wave passes from a more dense material to a less dense material, it speeds up and so will bend.



Imagine a car travelling across a muddy river at an angle. As it approaches the bank of the river, one of the wheels will be on the dry bank while the other is still in the mud. The wheel on the dry bank will move faster than the one still in the mud and it will change direction.

**Sound Waves (Higher tier only)**

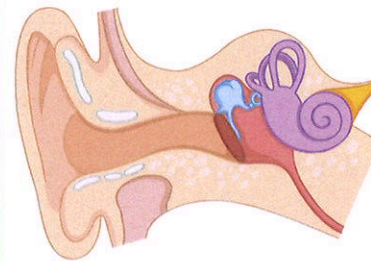
When an object vibrates, it can cause a **sound wave**. Remember, a sound wave is a **longitudinal wave**:



A sound wave can travel through a solid material. This is because the space between the particles is so small (almost non-existent) and the vibrations are transmitted more quickly than in liquids or gases.

The speed of sound in air is about 330m/s. As the majority of space is a **vacuum** (no particles), sound waves do not travel in space.

Sound waves within the range of **20Hz to 20kHz** can usually be detected by the **human ear**.

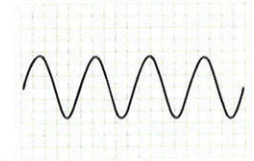
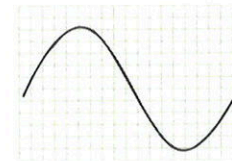
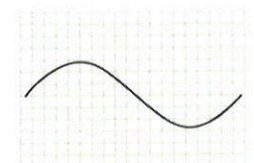
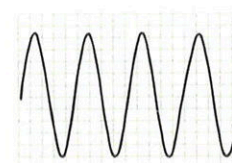


Vibrations are passed along air particles down the ear canal and to the ear drum. The ear drum vibrates and transmits this to the small ear bones and then along the cochlea. The cochlea carries the vibrations to the auditory nerve which carries the sound wave as an electrical impulse to the brain.

Characteristics of a sound wave can be identified from an **oscilloscope trace** of the sound wave. The trace shows oscillations and wavelength of the sound wave. A **shorter wavelength** results in a **high-pitched** (high frequency) sound. A **greater height** of oscillations indicates a **higher amplitude** (volume) of the sound wave.

high frequency,  
high amplitude

low frequency,  
low amplitude



low frequency,  
high amplitude

high frequency,  
low amplitude

**Waves for Detection and Exploration (Higher tier only)**

Waves can be used to detect objects underwater, in the earth and even inside the human body.

**Sonar** systems used to explore **deep seas** use **high-frequency sound waves**. A sound wave is sent out from the device through the water and the **time taken** for the pulse to **reflect** from the surface is measured. The time taken with the speed of **sound in water** is used to find the **distance** of the object.

The equation used is:

**distance (m) = speed (of sound) (m/s) × time (s)**



# AQA GCSE Physics (Separate Science) Unit 6: Waves

**Volcanoes, earthquakes and explosions** cause **seismic waves** to travel through the earth. There are two different types of seismic waves: **S-waves** and **P-waves**.

- P-waves are longitudinal waves which travel relatively quickly through solids and liquids.
- S-waves are transverse waves and they travel slower and only in solids.

Seismic waves can **change direction** when they are **reflected** or **refracted** at the boundary of different media (solid, liquid or gas). The **epicentre** of an earthquake can be found by calculating the difference in time taken for S- and P-waves to reach a certain point. Since the waves can change direction, at least three points are used to **triangulate** the data and pinpoint the source (where they all intercept).

The study of seismic waves has given scientists new **evidence** about the structure of the earth in parts which are not visible for direct observations.

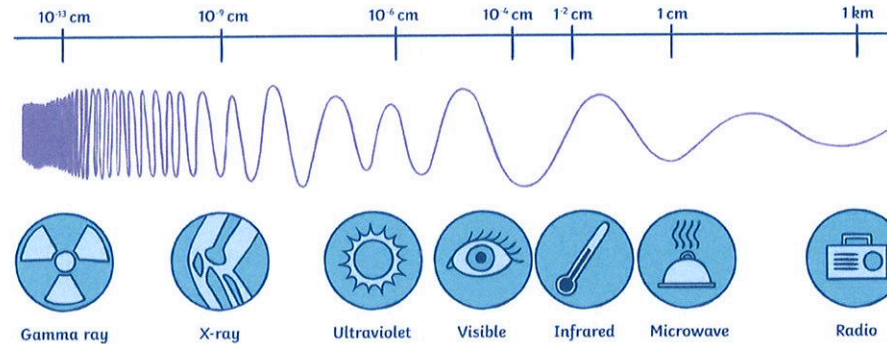
**Ultrasound** waves are sound waves which have a **higher frequency** than the range which is detectable by the human ear. When the waves reach a boundary between different media, they are **partially reflected** and a detector is used to measure the time taken and calculate the distance. Ultrasound is used for **medical and industrial imaging**.



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## The Electromagnetic Spectrum

**Electromagnetic waves** transfer energy from a source to an **absorber** as **transverse waves**. The different waves are grouped depending on their **frequency** and form a continuous spectrum known as the **electromagnetic spectrum**. Each of the frequencies of waves travel at the same **velocity** and can pass through a **vacuum** as well as **air**.



Frequency	Wave	Use	Other Information
Low ↑       ↓ High	radio waves	Communication via television and radio, and satellite communications.	Easily transmitted through air and can be reflected to change their direction. Harmless if absorbed by the human body. Are reflected back off the atmosphere and cannot pass through into space.
	microwaves	Communications including satellite communications and cooking food.	When the molecules absorb microwaves, their internal energy increases. This can be harmful when internal body cells become heated by over exposure to microwaves. Can pass through the atmosphere and into space.
	infrared	Short-range communications (remote controls), electrical heaters, cooking food, optical fibres, security systems and thermal imaging cameras.	It can cause burns to skin.
	visible light	Used for lighting, photography and fibre optics.	Frequency range that is detectable by the human eye.
	ultraviolet	Sterilising water and killing bacteria. Detecting forged bank notes.	Causes skin tanning and can lead to burns or skin cancer.
	X-rays	Medical imaging and airport security scanners.	Very little energy is absorbed by body tissues. Instead, it is transmitted through the body.
	gamma rays	Sterilising medical equipment or food and treatment for some cancers.	

You can remember the order of the electromagnetic spectrum easily with the phrase:

**Roman men invented very unusual X-ray guns.**



## AQA GCSE Physics (Separate Science) Unit 6: Waves

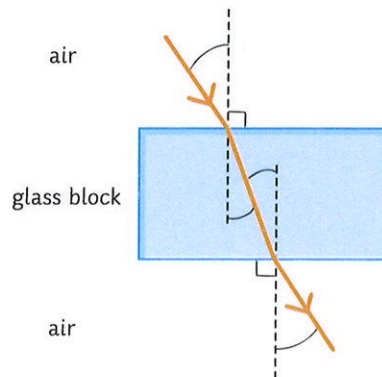
### Properties of Electromagnetic Waves

You should be able to complete or construct a **ray diagram** to show how a wave is **refracted** at the boundary of a different medium.

As the wave moves **to** a more dense medium (e.g. from gas to solid), it slows down and bends so that the angle from the normal becomes smaller. The angle of incidence is larger than the angle of refraction.

As the wave moves **from** a more dense medium (e.g. from solid to gas), it speeds up and bends so that the angle from the normal becomes larger. The angle of refraction is larger than the angle of incidence.

The angle at which a wave enters the glass block is equal to the angle that it leaves the glass block (when entering and leaving the same medium); however, if a wave crosses a boundary between two mediums at an angle of  $90^\circ\text{C}$ , then it will not change direction but instead carry on in a straight line.



**Gamma rays** occur as the result of changes to the nuclei of atoms and atoms themselves. It is a form of radiation and the waves can be generated and absorbed across a wide range of frequencies.

**UV, X-rays** and **gamma** are all types of **radiation** and can be **harmful** to human health; they cause damage to human body tissues. The severity of the damage caused depends on the dose of radiation a tissue or cell is exposed to. **Radiographers** and dentists who routinely carry out X-ray examinations wear a device to monitor the amount of exposure and ensure they are within a **safe limit**.

X-rays and gamma rays are **ionising** and can cause **mutations** to genes which may result in **cancer**.

**UV waves** can cause the skin to burn and age prematurely. UV exposure also increases the risk of developing **skin cancer**.

### Radio Waves (Higher tier only)

**Oscillations** in **electrical circuits** can produce **radio waves** which when absorbed by a conductor, produce an **alternating current**.

The alternating current has the same **frequency** as the radio wave and so information can be coded for transmission. This is how **television** and **radio** are broadcast.

### Temperature of the Earth (Higher tier only)

The temperature of the earth depends on:

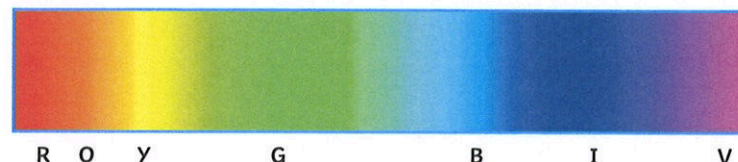
- The rate at which **light** radiation and **infrared** radiation are **absorbed** by the **earth's surface** and **atmosphere**.
- The rate at which **light** radiation and **infrared** radiation are **emitted** by the **earth's surface** and **atmosphere**.

Light and infrared radiation absorbed by the earth cause the **internal energy** of the planet to **increase** and in turn, the surface of the earth **increases in temperature**.

Energy from the surface of the earth can be transferred to the atmosphere by **conduction** and **convection**.

The **infrared** radiation **emitted** from the earth's surface will either travel through the atmosphere and back into **space** or it will be **absorbed** (and **reflected**) by the **greenhouse gases** in the earth's atmosphere.

### Visible Light



The colours of the **visible spectrum** can be remembered with the rhyme **Richard Of York Gave Battle In Vain** (red – orange – yellow – green – blue – indigo – violet).

These are all the **wavelengths** which are visible and detectable by the **human eye**. Each colour has a narrow range of wavelength and frequency within the spectrum.

**White light** is the combination (full spectrum) of wavelengths in the visible light region of the electromagnetic spectrum.





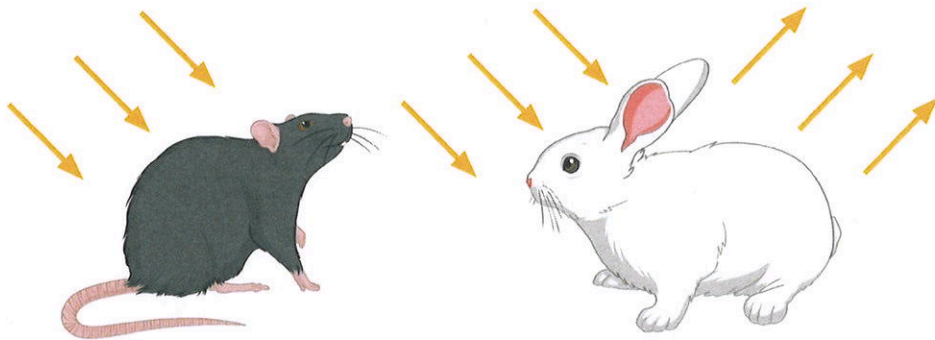
## AQA GCSE Physics (Separate Science) Unit 6: Waves

A **colour filter** absorbs some wavelengths and only transmits certain wavelength(s). This means that a filter will absorb some colours and transmit others.

For example, a red filter absorbs all other colours in the spectrum except red, which it transmits.

An object which is **transparent** (see-through) or **translucent** (partially see-through) can transmit light.

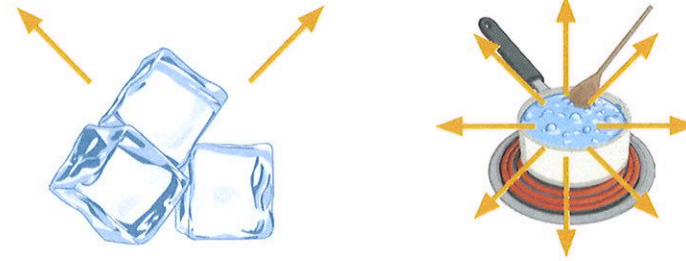
Opaque objects reflect and absorb light. The wavelengths which are reflected or absorbed determine the colour which the object is perceived.



For example, an object which absorbs all wavelengths will appear black. An object which reflects all wavelengths will appear white. An object which reflects only green colour wavelengths and absorbs the others will appear green.

## Black Body Radiation

All objects **emit** and **absorb infrared radiation**. The hotter an object is, the greater the amount of radiation emitted.



An object which absorbs all the radiation it is exposed to is called a **perfect black body**. No radiation is reflected from or transmitted through it. A perfect black body would be the most **effective emitter** as an object which is a good absorber is also a good emitter.

### (Higher tier only)

An object <b>absorbing and emitting infrared radiation at the same rate</b> has a <b>constant temperature</b> .	An object <b>emitting more than it is absorbing</b> will <b>decrease in temperature</b> .	An object <b>absorbing more than it is emitting</b> will <b>increase in temperature</b> .





# AQA GCSE Physics (Separate Science) Unit 6: Waves

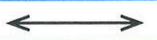



## Lenses

Lenses use **refraction** in order to work. **Projectors, microscopes and telescopes** all use lenses to allow an object or image to be enlarged or viewed more easily.

The **human eye** contains a lens which enables us to see objects at a range of distances.

Depending on the type of **lens**, the light waves will be **refracted** differently to produce a different image.

The two main lenses are **convex lenses** and **concave lenses**. The table below compares them briefly.

convex lens	Lens	concave lens
	Ray Diagram	
	Illustration	
Causes parallel waves to <b>converge</b> at the principal focus.	Action	Causes parallel waves to <b>diverge</b> from the principal focus.
real or virtual	Type of Image	always virtual

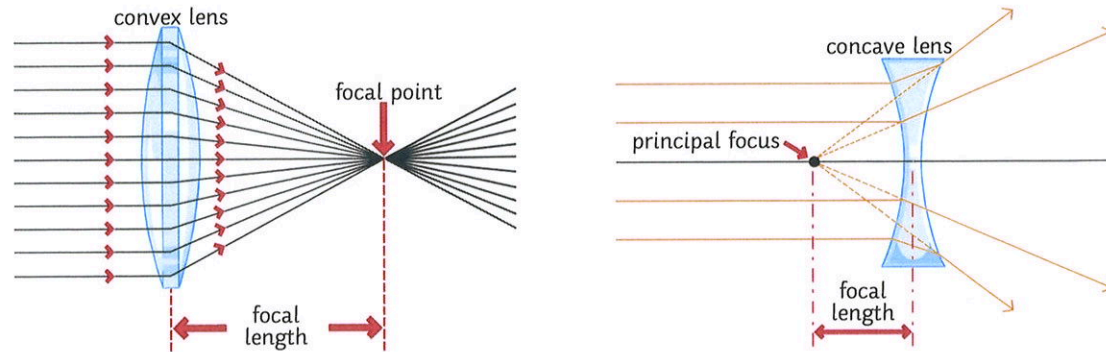
A **real image** is when light reflected from an object **converges** to form an image on a surface. For example, on the retina of the human eye.

A **virtual image** occurs when the light waves are **diverging** and so appears to be coming from a different place. A virtual image cannot be projected onto a screen. For example, a mirror produces a virtual image.

A magnifying glass uses a converging (convex) lens. It produces a virtual image which appears larger than the actual object. The magnification can be calculated using the equation:

$$\text{magnification} = \frac{\text{image height (mm)}}{\text{object height (mm)}}$$

An imaginary horizontal line through the middle of the lens is called the **axis** and this is where the **principal focus** forms. In a **convex lens**, the light rays enter the lens **parallel** to one another and then **converge** at the principal focus **after** the lens. In a **concave lens**, the light rays enter the lens **parallel** to one another and then **diverge**. The principal focus is the virtual source of the diverging rays **before** the lens.



$$\text{power (D)} = \frac{1}{\text{focal length (m)}}$$

- D stands for dioptres which is the unit of measurement for lens power.
- In a **converging** lens the power is a **positive** value.
- In a **diverging** lens the power is a **negative** value.

Focal length depends on two factors: the **refractive index** of a material and how **curved** the surfaces of the lenses are. A higher refractive index makes the lens **flatter** in shape. To make a powerful lens thinner, a material with a higher refractive index can be used.

Objects which are a distance **greater than one focal length** away from a converging lens will produce a **real image**. Objects which are closer **than one focal length** from the converging lens will produce a **virtual image**.

The **lens equation** can be used to show the relationship between focal length, position of the **object** and position of the **image**:

$$\frac{1}{\text{focal length}} = \frac{1}{\text{distance between lens and object}} + \frac{1}{\text{distance between lens and image}}$$

This equation can also be written as:

$$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$$

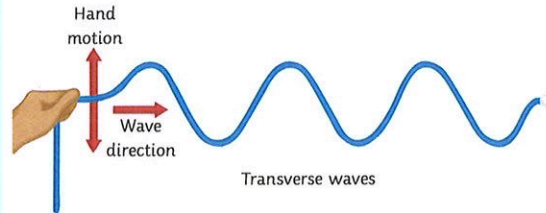




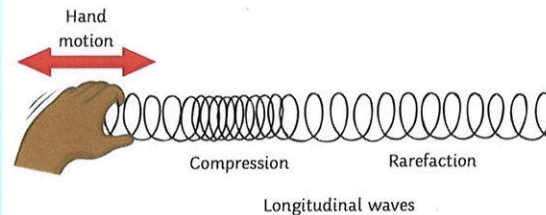
**Transverse and Longitudinal Waves**

Waves can be either **transverse** or **longitudinal**.

In a transverse wave, the vibrations are at a right angle (**perpendicular**) to the direction of the energy transfer. The wave has **peaks** (or **crests**) and **troughs**. Examples include **water waves** and **light waves**.

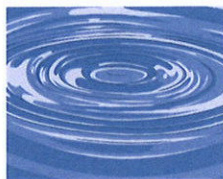


In a longitudinal wave, the vibrations are in the same direction (**parallel**) as the energy transfer. The wave has areas of **compression** and **rarefaction**. Examples of this type of wave are **sound waves**.

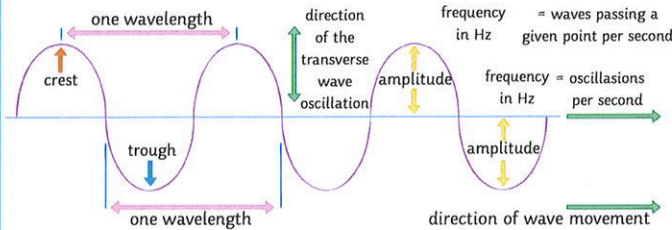


When a wave travels, energy is transferred but the matter itself does not move. Particles of water or air vibrate and transfer energy but do not move with the wave.

This can be shown by placing a cork in a tank of water and generating ripples across the surface. The cork will bob up and down on the **oscillations** of the wave but will not travel across the tank.



**Properties of Waves**



The **frequency** of a wave is the number of waves which pass a given point every second.

**time period (s) = 1 ÷ frequency (Hz)**

**t = 1 ÷ f**

The **wave speed** is how quickly the energy is transferred through a medium (how quickly the wave travels).

**wave speed (m/s) = frequency (Hz) × wavelength (m)**

**v = f × λ**

The speed of **sound waves** travelling through air can be measured by a simple method. One person stands a measured distance from a large flat wall, e.g. 100m. The person then claps and another person measures the time taken to hear the echo. The speed of the sound can then be calculated using the equation

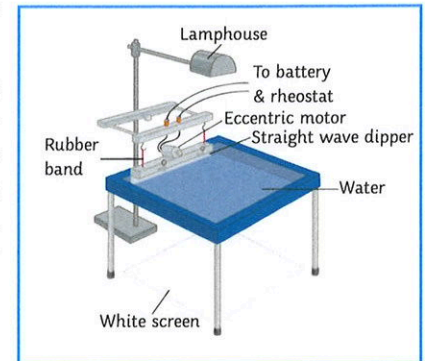
**speed = distance × time.**

Remember the distance will be double because the wave has travelled to the wall and back again. It is important to take several measurements and calculate the average to reduce the likelihood of human error.

**Required Practical Investigation 8**

**Aim:** make observations and identify the suitability of apparatus to measure the frequency, wavelength and speed of waves in a ripple tank and waves in a solid, and take appropriate measurements.

The **ripple tank apparatus** shown is the most commonly used for this investigation. It is likely you will work in groups or observe the investigation as a demonstration by your teacher.



**Method** (assuming the apparatus is already set-up):

Turn on the power and observe the waves. Make any necessary adjustments to the equipment so that the waves are clear to observe (alter the voltage supplying the motor). **N.B. The lowest frequency setting on the motor will ensure that the waves measurements can be made more easily.**

To measure the **wavelength**, use the metre ruler and make an estimate quickly. You may want to use a **stroboscope** and freeze the wave patterns to make measurements.

**Record 10 wavelengths** and calculate the **average** value.

To measure the wave **frequency**, mark a given point onto the white paper and **count** the number of waves which pass the point within **10 seconds**. Divide your answer by 10 to find the number of **waves per second**.

**Record 10 frequencies** and calculate the **average** value.

To calculate the wave speed, use this formula:

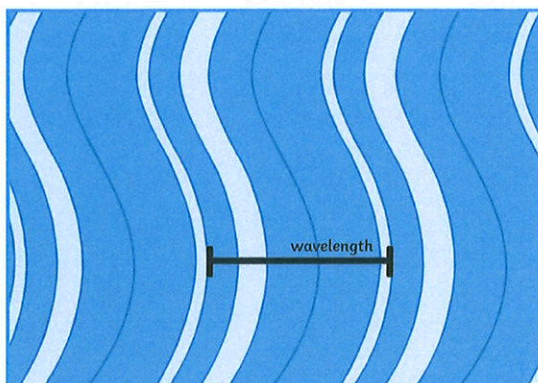
**speed = frequency × wavelength**





## AQA GCSE Physics (Combined Science) Unit 6: Waves

**Remember:** the wavelength is the distance between one peak (or crest) of a wave and the next peak.



### Required Practical Investigation 9

**Aim:** investigate the reflection of light by different types of surface and the refraction of light by different substances.

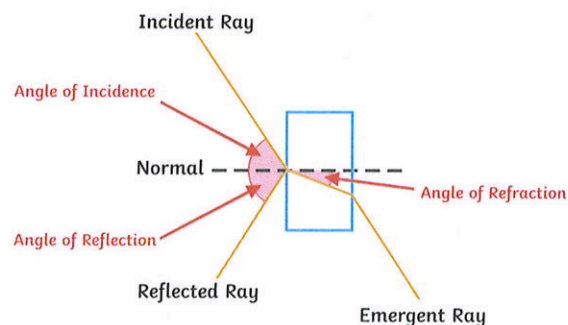
**Method:**

1. In a darkened room, set up the ray box on a flat surface and insert the filter to produce a single ray of light.
2. Place a glass block in the centre of a piece of plain A3 paper.
3. Draw a line around the glass block.
4. Draw a line at 90° to the glass block and label the line normal, as shown in the diagram.
5. Position the ray box so the ray of light hits the glass at an angle.
6. Using a pencil, draw the incidence, reflected and emergent rays as shown in the diagram.
7. Remove the glass block and draw the refracted ray going through the block.

8. Using a protractor, measure the angles of incidence, reflection and refraction. Record your results.
9. Repeat the experiment by placing a clear acrylic block on the A3 paper in the same position as the glass block.
10. The incident ray must follow the same line as before. Draw the reflected and refracted rays and measure using a protractor.
11. Collect four sets of results from other members of the class.

The law of reflection states:

**angle of incidence = angle of reflection**



**Risk assessment:**

The ray box will become hot during use and may cause minor burns. To prevent this, you should not touch the lamp and ensure you allow time for the ray box to cool after use.

You will be working in a semi-dark environment which means there is a higher risk of trips or falls. You should ensure your working space is clear of bags and coats, and that stools are tucked under desks before you start your investigation.

### Required Practical Investigation 10

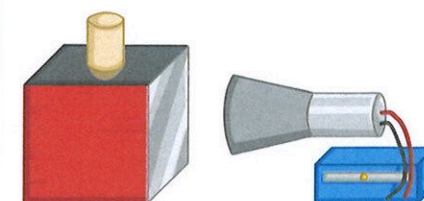
**Aim:** investigate how the amount of infrared radiation absorbed or radiated by a surface depends on the nature of that surface.

In this investigation, you are finding out which type of surface emits the most **infrared** radiation:

- dark and matt
- dark and shiny
- light and matt
- light and shiny

**Method:**

1. Place the **Leslie cube** on a heatproof mat.
2. Once the kettle has boiled, fill the Leslie cube with hot water.
3. Ensuring that the **thermometer** or the **infrared detector** is an **equal distance** from each of the surfaces (in turn) on the Leslie cube, measure the amount of infrared radiation emitted.
4. Repeat the experiment twice more to collect three results for each surface.

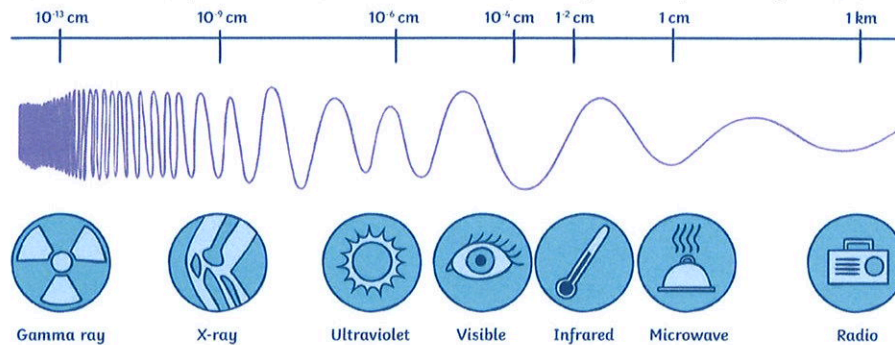




# AQA GCSE Physics (Combined Science) Unit 6: Waves

## The Electromagnetic Spectrum

Electromagnetic waves transfer energy from a source to an **absorber** as **transverse** waves. The different waves are grouped depending on their **frequency** and form a continuous spectrum known as the **electromagnetic spectrum**. Each of the frequencies of waves travel at the same **velocity** and can pass through a **vacuum** as well as **air**.



Frequency	Wave	Use	Other Information
Low ↑          ↓ High	radio waves	Communication via television and radio, and satellite communications.	Easily transmitted through air and can be reflected to change their direction. Harmless if absorbed by the human body. Are reflected back off the atmosphere and cannot pass through into space.
	microwaves	Communications including satellite communications and cooking food.	When the molecules absorb microwaves, their internal energy increases. This can be harmful when internal body cells become heated by over exposure to microwaves. Can pass through the atmosphere and into space.
	infrared	Short-range communications (remote controls), electrical heaters, cooking food, optical fibres, security systems and thermal imaging cameras.	It can cause burns to skin.
	visible light	Used for lighting, photography and fibre optics.	Frequency range that is detectable by the human eye.
	ultraviolet	Sterilising water and killing bacteria. Detecting forged bank notes.	Causes skin tanning and can lead to burns or skin cancer.
	X-rays	Medical imaging and airport security scanners.	Very little energy is absorbed by body tissues. Instead, it is transmitted through the body. These waves can lead to gene mutation and cancer.
	gamma rays	Sterilising medical equipment or food and treatment for some cancers.	

You can remember the order of the electromagnetic spectrum easily with the phrase:

**Roman men invented very unusual X-ray guns.**





## AQA GCSE Physics (Combined Science) Unit 6: Waves

### Properties of Electromagnetic Waves

You should be able to complete or construct a **ray diagram** to show how a wave is **refracted** at the boundary of a different medium.

As the wave moves **to** a more dense medium (e.g. from gas to solid), it slows down and bends so that the angle from the normal becomes smaller. The angle of incidence is larger than the angle of refraction.

As the wave moves **from** a more dense medium (e.g. from solid to gas), it speeds up and bends so that the angle from the normal becomes larger. The angle of refraction is larger than the angle of incidence.

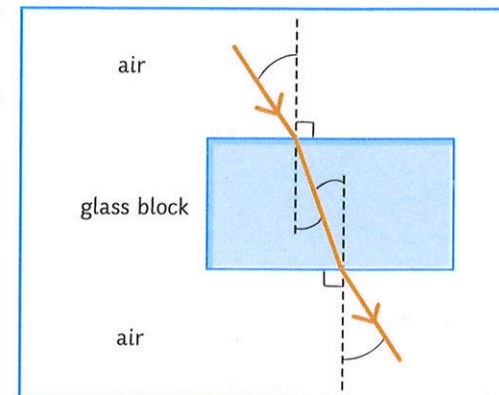
The angle at which a wave enters the glass block is equal to the angle that it leaves the glass block (when entering and leaving the same medium); however, if a wave crosses a boundary between two mediums at an angle of  $90^\circ$ , then it will not change direction but instead carry on in a straight line.

**Gamma rays** occur as the result of changes to the nuclei of atoms and atoms themselves. It is a form of radiation and the waves can be generated and absorbed across a wide range of frequencies.

**UV, X-rays** and **gamma** are all types of **radiation** and can be **harmful** to human health; they cause damage to human body tissues. The severity of the damage caused depends on the dose of radiation a tissue or cell is exposed to. **Radiographers** and dentists who routinely carry out X-ray examinations wear a device to monitor the amount of exposure and ensure they are within a **safe limit**.

X-rays and gamma rays are **ionising** and can cause **mutations** to genes which may result in **cancer**.

**UV waves** can cause the skin to burn and age prematurely. UV exposure also increases the risk of developing **skin cancer**.



### Radio Waves (Higher tier only)

**Oscillations** in **electrical circuits** can produce **radio waves** which when absorbed by a conductor, produce an **alternating current**.

The alternating current has the same **frequency** as the radio wave and so information can be coded for transmission. This is how **television** and **radio** are broadcast.





**Crude Oil**

**Hydrocarbons** are compounds that are made up of the elements **hydrogen** and **carbon** only.

Crude oil is a **non-renewable resource**, a **fossil fuel**. Crude oil is made up of a mixture of compounds, most of which are long- and short-chain hydrocarbons.

Most of the compounds in crude oil are hydrocarbons called **alkanes**. The alkanes form a **homologous series**. This is a family of hydrocarbons that all share the **same general formula** and have **chemical properties** that are **similar**.

Alkanes are held together by **single bonds**.

The general formula for an alkane is  $C_nH_{2n+2}$ .

They differ from the neighbouring alkane with the addition of a  $CH_2$ .

Alkanes are **saturated hydrocarbons**. This means that all their bonds are taken up and they cannot bond to any more atoms.

Alkanes have **similar chemical properties** but have **different physical properties** due to differences in chain length. The longer the chain, the higher the boiling point of the hydrocarbon.

The first four alkanes are: methane, ethane, propane and butane.

A mnemonic to help you remember the order of the alkanes: **mice eat paper bags**.


**Fractional Distillation**

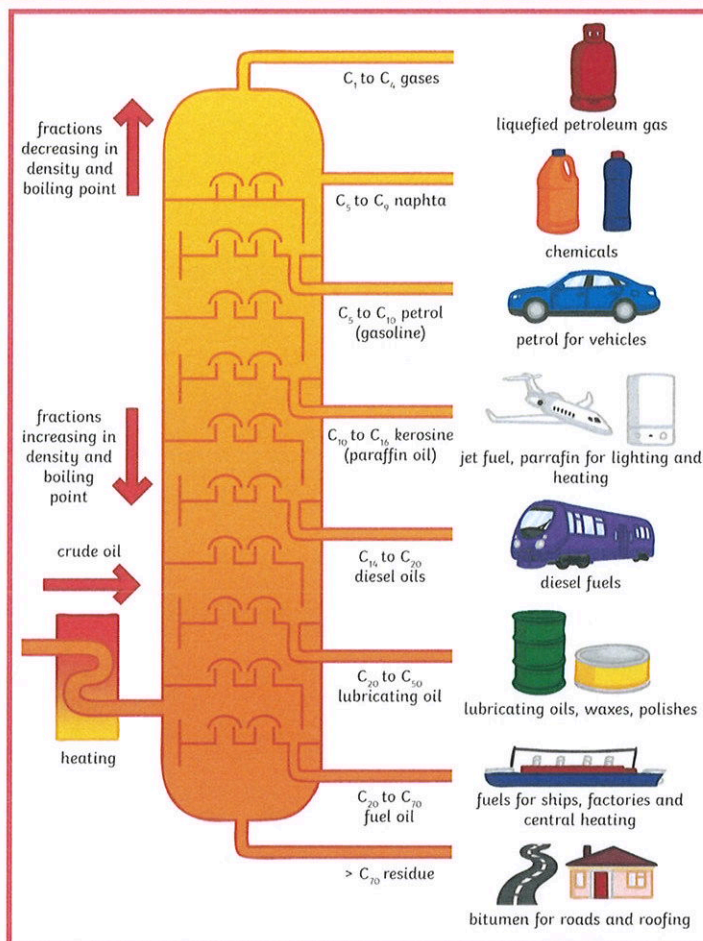
Fractional distillation is used to **separate** a mixture of long-chain hydrocarbons in crude oil into smaller, more useful fractions.

Hydrocarbons have different boiling points depending on their chain length. **Each fraction contains hydrocarbons of a similar chain length**. These fractions will boil at different temperatures due to the difference in sizes of the molecules. The different parts of crude oil are called fractions because they are a small part of the original mixture.

**Crude oil** is heated and enters at all column called a **fractioning column**. The column is **hot at the bottom** and decreases in temperature toward the top. As the crude oil is heated, it begins to evaporate and its vapours begin to rise up through the column. These vapours condense at the different fractions.

**Short-chain hydrocarbons** are found at the **top** of the column. This is because shorter chain molecules are held together by **weak intermolecular forces** resulting in low boiling points. These shorter chain hydrocarbons leave the column as gas.

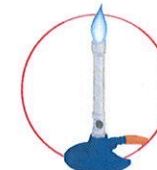
**Long-chain hydrocarbons** are found at the bottom of the column and are held together by **strong intermolecular forces**, resulting in high boiling points.



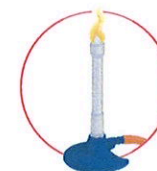
Name of Alkane	Structural Formula	Molecular Formula
methane	$\begin{array}{c} H \\   \\ H-C-H \\   \\ H \end{array}$	$CH_4$
ethane	$\begin{array}{c} H & H \\   &   \\ H-C & -C-H \\   &   \\ H & H \end{array}$	$C_2H_6$
propane	$\begin{array}{c} H & H & H \\   &   &   \\ H-C & -C & -C-H \\   &   &   \\ H & H & H \end{array}$	$C_3H_8$
butane	$\begin{array}{c} H & H & H & H \\   &   &   &   \\ H-C & -C & -C & -C-H \\   &   &   &   \\ H & H & H & H \end{array}$	$C_4H_{10}$

**Combustion**

**Complete combustion** occurs when there is **enough oxygen** for a fuel to burn. A hydrocarbon will react with oxygen to produce carbon dioxide and water.



**Incomplete combustion** occurs when there **isn't enough oxygen** for a fuel to burn. The products in this reaction are water and poisonous **carbon monoxide**.





# AQA GCSE Chemistry (Combined Science) Unit 7: Organic Chemistry Knowledge Organiser

## Cracking

Cracking is an example of a **thermal decomposition reaction**. **Long-chain** hydrocarbons can be **broken** down into **shorter**, more useful hydrocarbon chains.

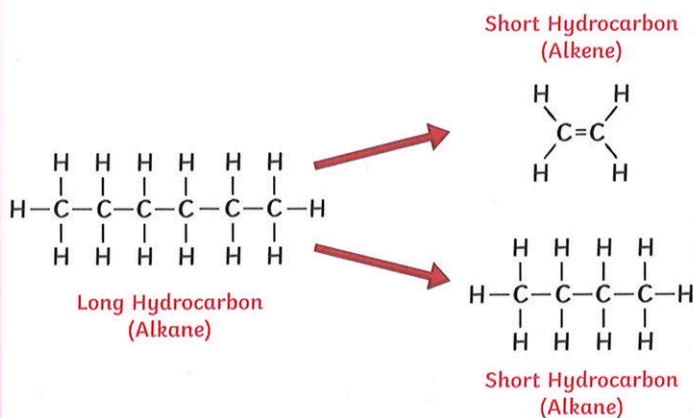
Cracking can be carried out with a catalyst in **catalytic cracking** or with steam in **steam cracking**.

Catalytic cracking involves heating a hydrocarbon to a high temperature (550°C) and passing over a hot catalyst.

Cracking of a long-chain hydrocarbon **produces a short-chain alkane** and an **alkene**.

Alkenes are another type of hydrocarbon that is double bonded. The general formula for an alkene is  $C_nH_{2n}$ .

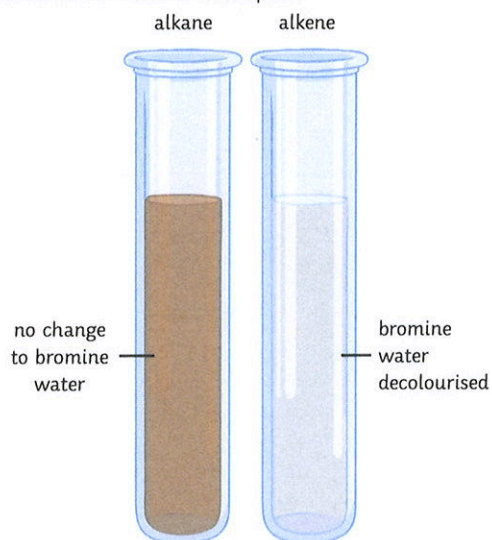
Alkenes are **unsaturated hydrocarbons**. In a chemical reaction, the double bond of the alkenes can break. This allows other atoms to bond to it.



## Test for Alkanes

Bromine, when added to an **alkane**, will **remain brown/orange**. Alkanes are saturated hydrocarbons, they have no double bonds which could be broken to accept the bromine molecule and so remain orange.

Bromine, when added to an **alkene**, will **change from brown/orange to colourless**. This is because alkenes are unsaturated hydrocarbons. The double bond breaks and the bromine molecule is accepted.



## Making Polymers

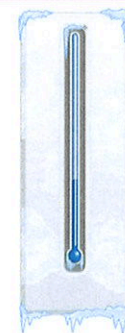
The fractional distillation of crude oil and cracking produces an array of hydrocarbons that are key to our everyday lives.

Alkenes are used to produce plastics such as poly(ethene) which is used to make plastic bags, drinks bottles and dustbins. Poly(propene), another polymer, forms very strong, tough plastic.

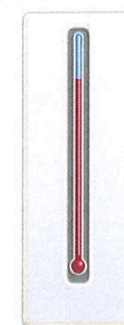
## Short-Chain Molecules

## Increasing Chain Length

## Long-Chain Molecules



As chain length increases, the **boiling point** of the hydrocarbon chains also increases.



thin



**Viscosity** describes how easily a substance can flow e.g. treacle is very viscous; it is thick.

thick



**Flammability** is a measure of how easily a substance burns.





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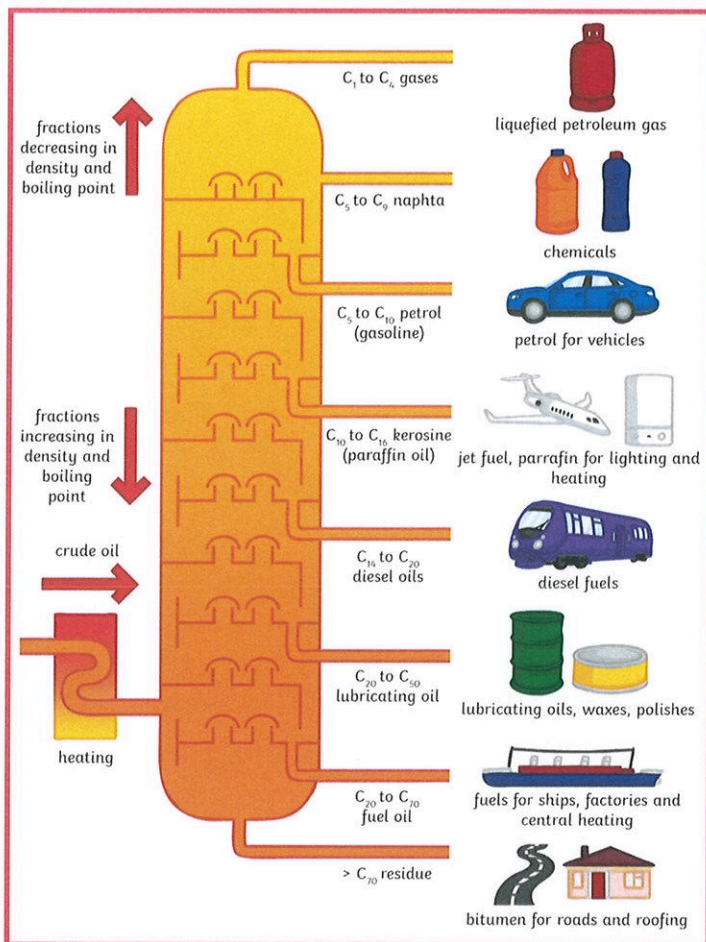
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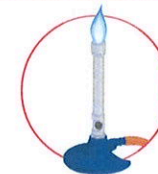
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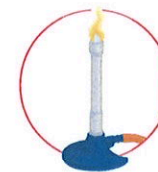
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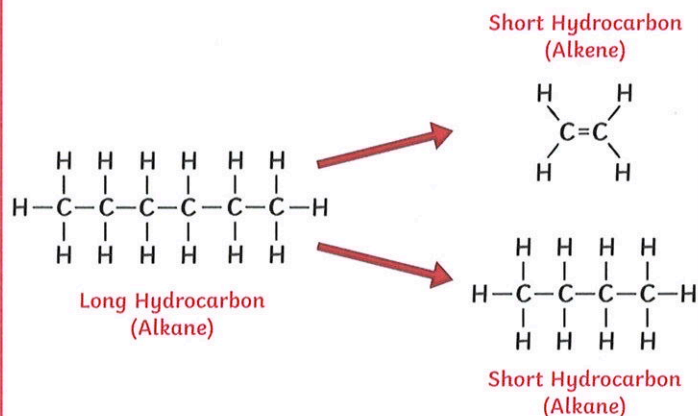
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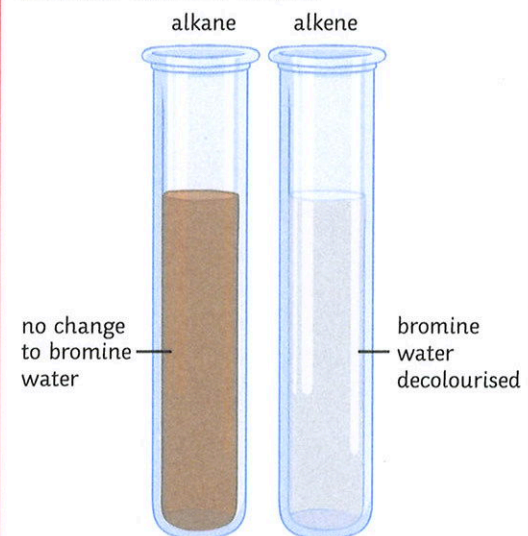
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### Making Polymers

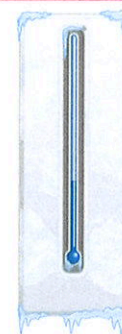
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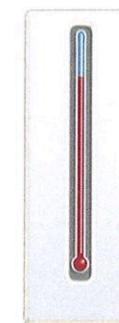
Short-Chain Molecules

Increasing Chain Length

Long-Chain Molecules



As chain length increases, the **boiling point** of the hydrocarbon chains also increases.



thin



**Viscosity** describes how easily a substance can flow e.g. treacle is very viscous.

thick



**Flammability** is a measure of how easily a substance burns.





## Alkenes (Chemistry Only)

Name of Alkene	Structural Formula	Molecular Formula
ethene	$\begin{array}{c} \text{H} & & \text{H} \\ & \backslash & / \\ & \text{C} = \text{C} \\ & / & \backslash \\ \text{H} & & \text{H} \end{array}$	C <sub>2</sub> H <sub>4</sub>
propene	$\begin{array}{c} \text{H} & \text{H} & \text{H} \\   &   &   \\ \text{H}-\text{C}-\text{C}=\text{C} \\   & &   \\ \text{H} & & \text{H} \end{array}$	C <sub>3</sub> H <sub>6</sub>
butene	$\begin{array}{c} \text{H} & \text{H} & \text{H} & \text{H} \\ &   &   &   \\ & \text{C} = \text{C} - \text{C} - \text{C} - \text{H} \\ & / &   &   \\ \text{H} & & \text{H} & \text{H} \end{array}$	C <sub>4</sub> H <sub>8</sub>
pentene	$\begin{array}{c} \text{H} & \text{H} & & \text{H} & \text{H} \\   &   & &   &   \\ \text{H}-\text{C}-\text{C}-\text{C}=\text{C}-\text{C}-\text{H} \\   &   & &   &   \\ \text{H} & \text{H} & & \text{H} & \text{H} \end{array}$	C <sub>5</sub> H <sub>10</sub>

Alkenes are another type of hydrocarbon that is double bonded. The general formula for an alkene is C<sub>n</sub>H<sub>2n</sub>.

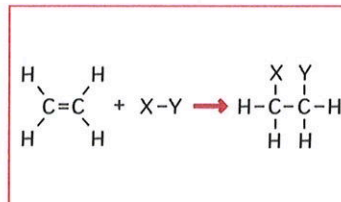
Alkenes are **unsaturated hydrocarbons**. In a chemical reaction, the double bond of the alkenes can break. This allows other molecules to bond to it. Note that alkenes all have the suffix 'ene'.

## Reactions of Alkenes (Chemistry Only)

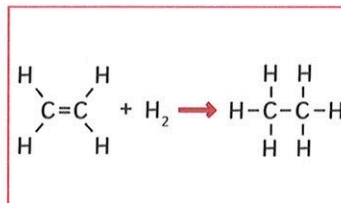
Alkenes, just like alkanes, also undergo **combustion** reactions. Alkenes rarely combust completely and tend to undergo **incomplete combustion**. When burning in the air, they produce a smoky flame.

**Alkenes** have the functional group C=C. This double bond between the carbon atoms is able to undergo an addition reaction. This means that the double bond can break and will accept another molecule.

**Alkanes** are **unable** to take part in **addition reactions** as their functional group is C-C. This means the bond cannot break in order to accept a new molecule.

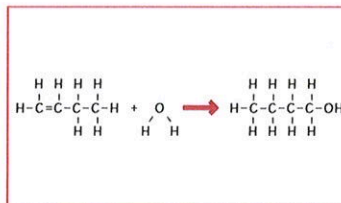


**Alkenes** are able to **react** with **hydrogen** in an addition reaction called **hydrogenation**. This particular reaction **requires** a **catalyst**.

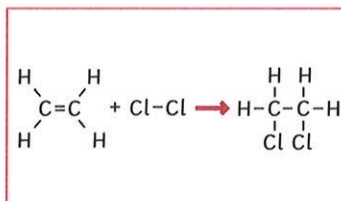


**Alkenes** can also **react** with **water** to **produce** an **alcohol**. This is called a **hydration reaction**.

The type of compound produced contains a hydroxyl group (-OH), this compound is an alcohol. The reaction **requires** a **high temperature** (300°C) and a **catalyst**.



Addition reactions also occur with the **group 7 elements**, the **halogens**. The reaction is called a **halogenation reaction**. When an **alkene reacts** with a **halogen**, an **alkyl halide** is produced.



## Alcohols (Chemistry Only)

Alcohols all belong to the **same homologous group**. This is a group of organic compounds that have the same functional group (-OH, **hydroxyl group**) and that have similar chemical properties but different physical properties to each other. Note that alcohols all have the suffix 'ol'.

Name of Alcohol	Structural Formula	Molecular Formula	Uses
methanol	$\begin{array}{c} \text{H} \\   \\ \text{H}-\text{C}-\text{O}-\text{H} \\   \\ \text{H} \end{array}$	CH <sub>3</sub> OH	chemical feedstock
ethanol	$\begin{array}{c} \text{H} & \text{H} \\   &   \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\   &   \\ \text{H} & \text{H} \end{array}$	C <sub>2</sub> H <sub>5</sub> OH	alcoholic drinks, fuels and solvents
propanol	$\begin{array}{c} \text{H} & \text{H} & \text{H} \\   &   &   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{O}-\text{H} \\   &   &   \\ \text{H} & \text{H} & \text{H} \end{array}$	C <sub>3</sub> H <sub>7</sub> OH	fuels and solvents
butanol	$\begin{array}{c} \text{H} & \text{H} & \text{H} & \text{H} \\   &   &   &   \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{O}-\text{H} \\   &   &   &   \\ \text{H} & \text{H} & \text{H} & \text{H} \end{array}$	C <sub>4</sub> H <sub>9</sub> OH	fuels and solvents



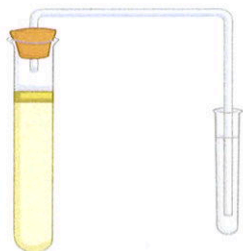


# AQA GCSE Chemistry (Separate Science) Unit 7: Organic Chemistry Knowledge Organiser

## Fermentation

The alcohol that is found in beers, wines and spirits is called ethanol. Ethanol isn't just used in alcoholic drinks, it can also be used as a fuel in vehicles. Ethanol is made through the process of **fermentation**.

Fermentation is an **anaerobic process** and this means that it occurs **without oxygen**.



The fermentation process requires yeast, sugar and water, a warm temperature between 25-35°C and a reaction vessel that will allow **carbon dioxide** to **escape** but not allow oxygen to get in.

The enzymes needed for fermentation are provided by a single-celled fungus called **yeast**. If the temperature of the reaction mixture is too **cold**, the **fermentation** process will happen very **slowly** or not at all.

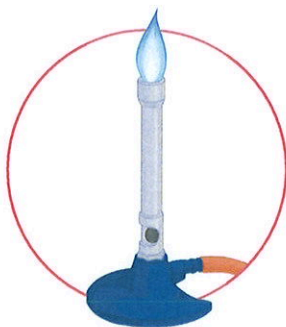
If the reaction mixture containing the yeast becomes too **hot**, the **enzymes** may become **denatured** and the process of **fermentation** will **stop**.

If **oxygen** is allowed to enter the reaction vessel, the **ethanol** will **oxidise** and form ethanoic acid making the drink taste of **vinegar**.

## Combustion

**Complete combustion** occurs when there is **enough oxygen** for a fuel to burn. An alcohol will react with oxygen to produce carbon dioxide and water.

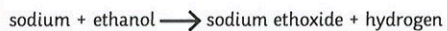
ethanol + oxygen  $\longrightarrow$  carbon dioxide + water



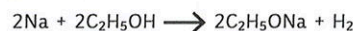
## Reactions with Sodium Metal

When dropped into **ethanol**, **sodium** produces **sodium ethoxide** and **hydrogen gas**. Methanol, propanol and butanol all undergo a similar reaction with sodium.

The word equation for this reaction is:



The symbol equation for this reaction is:



## Oxidation of Alcohol

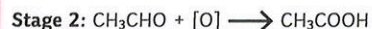
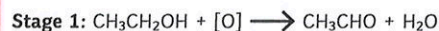
Alcohols can be **oxidised** to produce a carboxylic acid. Carboxylic acids are a family of compounds that contain the functional group **-COOH** (carboxyl group). Note that carboxylic acids have the suffix '**oic acid**'. The carboxylic acids have varying physical properties but similar chemical properties.

**Oxidation** can mean a number of different things: the loss of electrons, the addition of oxygen or the removal of hydrogen. In a chemical equation, the oxidising agent is represented as **[O]**, this symbol means **oxygen from the oxidising agent**.

ethanol + oxidising agent  $\longrightarrow$  ethanoic acid + water



The equation can also be written in two stages. The first stage shows the formation of **ethanal** and the second stage shows its oxidation.



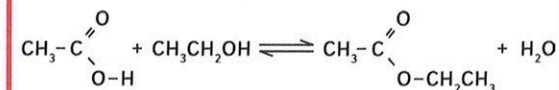
## Carboxylic Acids

Carboxylic acids are able to react with bases to produce a salt and water. They are also able to react with carbonates to produce a salt, water and carbon dioxide.

When a carboxylic acid is heated with an alcohol in the presence of an acid catalyst (usually concentrated sulfuric acid), an **ester** is formed. Esters typically smell fruity and are used in perfumes. They have the functional group **-COO-**.

For example:

ethanoic acid + ethanol  $\rightleftharpoons$  ethyl ethanoate + water



Name of Carboxylic Acid	Structural Formula	Molecular Formula
methanoic acid	$\text{H-C}\begin{matrix} \text{O} \\ \parallel \\ \text{OH} \end{matrix}$	HCOOH
ethanoic acid	$\text{CH}_3\text{-C}\begin{matrix} \text{O} \\ \parallel \\ \text{OH} \end{matrix}$	CH <sub>3</sub> COOH
propanoic acid	$\text{CH}_3\text{-CH}_2\text{-C}\begin{matrix} \text{O} \\ \parallel \\ \text{OH} \end{matrix}$	C <sub>2</sub> H <sub>5</sub> COOH
butanoic acid	$\begin{matrix} \text{H} & \text{H} & \text{H} & \text{O} \\   &   &   & \parallel \\ \text{H-C} & \text{-C-} & \text{C-} & \text{C} \\   &   &   & \backslash \\ \text{H} & \text{H} & \text{H} & \text{O-H} \end{matrix}$	C <sub>3</sub> H <sub>7</sub> COOH

Carboxylic acids are **acidic** due to the hydrogen in the functional group (COOH). When a carboxylic acid forms a salt, the hydrogen is lost and replaced with a metal.





# AQA GCSE Chemistry (Separate Science) Unit 7: Organic Chemistry Knowledge Organiser

## Carboxylic Acids - Higher Tier Only

When dissolved in water, carboxylic acids are able to form **acidic solutions**. The pH of the solution is less than 7. They are **weak acids**. Carboxylic acid solutions contain **fewer hydrogen ions** compared with a solution that is the same concentration and contains a strong acid. **Strong acids** are **fully ionised** in solution whereas **weak acids** are only **partially ionised** in solution.

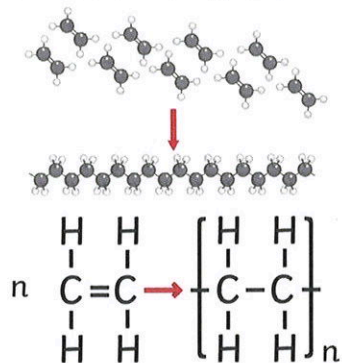
## Addition Polymerisation

Addition polymerisation occurs when **two or more monomers** join together to form a **polymer**.

For example, during the polymerisation of ethene, many monomers (single units of ethene) are joined together to make poly(ethene). **Poly** meaning 'many' (many ethene molecules joined together).

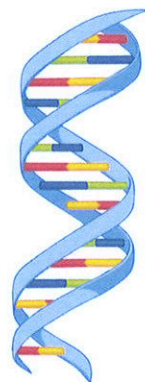
The number of ethene molecules that are joined together could be in the thousands, therefore, when writing the equation the letter 'n' is used to represent the **large number of molecules**.

Notice that the **monomer** of **ethene** has a **double bond**. When it bonds to form **poly(ethene)** the double bond breaks and a **single bond** is formed.



## Biological Polymers

**DNA** (deoxyribonucleic acid) is an example of a **naturally occurring polymer**. DNA is a **double helix** (twisted ladder) and it is made up of two polymer chains that are twisted to form a double helix. The **monomers** of the two polymer chains are called **nucleotides**. The four nucleotides in DNA are called adenine, guanine, cytosine and thymine. The nucleotide sequence codes for genes. **Genes** are **sections of DNA** that determine an organism's characteristics.



**Proteins** are another example of a naturally occurring polymer. Proteins are made from individual **monomer** units called **amino acids**. Proteins have many roles within our bodies; all enzymes are made from proteins.

Plants make the biological polymers **starch** and **cellulose**. They are made up of individual **monomer** units of **sugar** molecules. **Plants** use **starch** as a way to **store energy**. **Cellulose** is used by plants to give the **cell wall strength**.

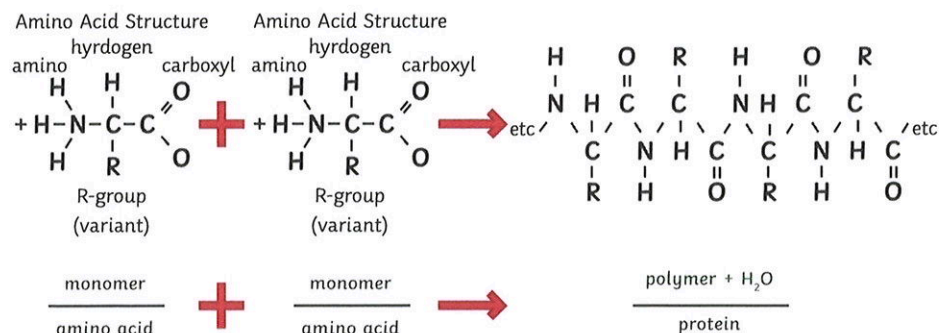
## Amino Acids - Higher Tier Only

There are 20 different types of amino acids and when arranged in a particular order, they produce the proteins that are found within our cells.

An amino acid is a molecule that has two functional groups. The amine group (**NH<sub>2</sub>**) and the carboxyl group (**COOH**). In between these two functional groups is a single carbon atom with a hydrogen atom bonded to it, along with another group.

Amino acids bond together through the process of a **condensation polymerisation** reaction.

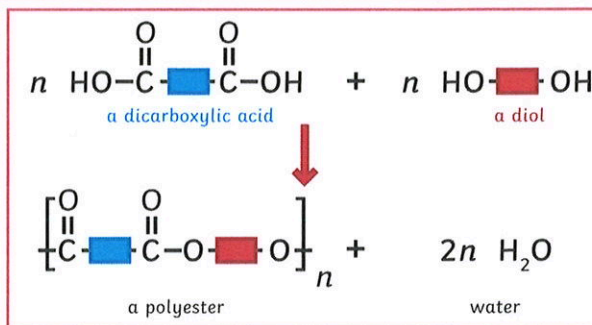
For every **monomer** (amino acid) that is added to the growing chain of the **polymer**, a molecule of **water** is **produced**.



## Amino Acids - Higher Tier Only

**Addition polymerisation** requires the monomers to have a **C=C double bond**. **Condensation polymerisation** does not require a C=C double bond but does need **two functional groups**. When two monomers react, a **water molecule** is usually **produced**.

An example of a condensation polymer is polyester. Polyester is made from one **monomer** that has **two hydroxyl groups** and another monomer which has **two carboxylic acid groups**.





## Start of Exam - 5mins

1. Read the glossary
2. Read the information box and underline:
  - Character
  - Setting
  - Place in Story
3. Read the passage WITHOUT looking at the questions. Focus on just understanding what is going on.



## Q1- 5mins

### Planning the answer:

4. Read the question and THINK.
5. On the question draw a box around which lines to focus on.
6. Draw a box around those lines on the insert.

### When writing the answer:

7. Use full sentences
8. Only have one point per line.
9. Be careful not to repeat points.

## Q2- 10mins



### Planning the answer:

9. Underline the part of the question that tells you what you have to comment on. E.g. 'the strangeness of the city'.
10. Identify the mood/ tone/ feeling of the piece.
11. On the insert underline and label:
  - Words and phrases
  - Language features & techniques (Figurative language and imagery)
  - Sentence form (if aiming for top band)

### When writing the answer:

12. Write an establishing sentence explaining the mood/tone linked to the question.
13. Write three BIG paragraphs (Evidence / Label/ Analysis)
  - Refer back to the establishing sentence (Overview, ELA, ELA, ELA) or (Overview, ELAAA)
  - Do this for each bullet point from the question.



## Q3- 10mins

### Planning the answer:

14. Draw a box around the phrase that says, 'on the whole of the source'.
15. On top of the insert write **Office Shift**
  - **O**pening
  - **F**ocus
  - **F**oreshadowing
  - **I**ntroduction
  - **C**ontrasting
  - **E**nding
  - **Shifts** from:
    - Out/in
    - Individual/group
    - Thought/action
    - Past/present/future



16. Label each paragraph of the extract with one or more of the **OFFICE SHIFT** points.

### When writing the answer:

17. Write your points into at least 4 PLEA paragraphs. (Point / Label/ Evidence / Analysis)
18. Sentence stems:
  - Para 1: *The writer focuses us on ... in the opening of the extract...*
  - Para 2: *The writer builds/changes/shifts ..... by... making the reader feel...*
  - Para 3: *The writer leaves us feeling ...*
  - Para 4: *A further structural technique use by the writer is...*

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Explorations in  
Creative Reading  
and Writing  
Language Paper 1  
1h 45m

## Q4- 30mins

### Planning the answer:

19. Draw a box around the phrase that says, 'Focus this part of your answer on...'
20. Draw a box around the PERSON who gives the opinion.
21. Draw a box around the section on the extract.
22. Underline the OPINION in the question. Annotate to understand.
23. IF THE STATEMENT IS POSITIVE YOU ARE GOING TO AGREE!
24. Rescan the passage. Underlining any additional language points linked to the focus of the question.
25. Write the word PLAN: at the top of the answer space.
26. In your plan put three points about the use language (add labels – simile, etc.)
27. In your plan put two points about sentence structure (add labels)

### When writing the answer:

28. Write an opening sentences responding to the opinion in the question.
29. Write your 5 points from the plan into at least 5 PLEAL paragraphs (Point / Label / Evidence / Analysis / Link back to the statement)
30. Sentence stems:
  - *To some extent I agree with...PLEAL*
  - *I certainly agree that...PLEAL*
  - *However it could also be argued that...PLEAL*
  - *Overall I agree with the statement that ....PLEAL*

45. PROOF READ your work (5mins)

- Read backwards to find spelling errors.
  - Read forwards to find missing words and punctuation.
46. It is okay to cross out and write a better word above a piece of dull or repeated vocabulary.

## Q5- 45mins

Miss Morgan

### Planning the answer: 15mins

31. Decide which of the two questions you want to. We recommend, if there is the option, to do the picture one.
32. READ THE CONTEXT SENTENCE and the instruction.
33. Consider the atmosphere you want to create.
34. STEAL good vocabulary from the extract you have read and think of others.
35. Choose ONE event/moment in time (NOT DAYS OR YEARS)
36. Plan the shaper of your description. OFFICE SHIFT. Zoom in OR zoom out?
37. Make sure you cover **CASSPIE** in your plan.

- **C**olour
- **A**djectives
- **S**ound/**S**mill
- **S**entence **S**tructure
- **P**unctuation
- **I**magery
- **E**motion



### When writing the answer: 30mins

40. Write your description / story
41. Start each paragraph in a different way:
  - Verb: 'ing' / 'ed' word
  - Adverb: 'ly' word
  - Preposition/Place word: 'on' / 'next to' / 'near' /
  - Adjectives: describing word
42. Remember to use a semi-colon (easiest way is to use where you what have used the word 'because'.
43. Remember to use a rhetorical question – this could make a good opening sentence.
44. Remember to use brackets to create an aside.




# Writers' Viewpoints and Perspectives Language Paper 2 (1h 45m)

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**Start of Exam - 5 mins**

1. Read the glossary
2. Read Source A **WITHOUT** looking at the questions. Focus on just understanding what is going on.




**Q1- 5mins**

1. Read the INSTRUCTIONS about how to shade VERY carefully (this is marked electronically and must be shaded right!)
2. Read ALL the statements BEFORE selecting.
3. Eliminate those you know are definitely wrong.
4. Re-read ALL of the sentence of the ones you think are correct – make sure.



**After Q1 - 5 mins**

1. Read the glossary
2. Read Source B **WITHOUT** looking at the questions. Focus on just understanding what is going on.




**Q2- 10mins**

**Planning the answer:**

9. On the question underline whether you are being asked to look for similarities or differences.
10. Underline the part of the question that tells you what you have to comment on. E.g. 'things to see and do'
11. On the sources underline quotations that link to the **focus** of the question.
12. Match the pairs of quotations that allow you to show the most inference. (3 pairs)


**When writing the answer:**  
In Source A, we learn about/that {question focus} is ... This suggests that ... It could also imply (use an alternative interpretation or a deeper meaning depending on what works best.) **Comparative Phrase**  
In Source B, we learn about/that ... This suggests that ... It could also imply (use an alternative interpretation or a deeper meaning depending on what works best.)

Complete **MINIMUM** of two **REALLY** well (three if you can manage.)



**AFORESTPACK: A**lliteration, **F**act, **O**pinion, **R**hetorical Question & **R**epetition, **E**motive Language and **E**xaggeration, **S**tatistics, **T**riplets, **P**ersonal Pronouns, **A**ncedotes, **C**onditional clauses, **K**eeP repeating.

**Q3 - 15mins**




**Planning the answer:**  
**MAKE sure you are writing about the right source and the right lines.**

9. Underline the part of the question that tells you what you have to comment on. E.g. 'how does Dickens use language to make the reader feel part of the fair'
10. Identify the purpose of the language linked to the question (persuasive, descriptive, inclusive).
11. On the insert scribble a reminder of devices you'd expect to see:
  - Words and phrases
  - Language features (e.g. imagery or persuasive techniques)
  - Sentence form (if aiming for top band)

**When writing the answer:**

12. Write an establishing sentence explaining the mood/tone linked to the question.
13. Write three **BIG** paragraphs (Evidence / Label / Analysis)
  - Refer back to the establishing sentence (Overview, ELA, link phrase, ELA, link phrase, ELA) or (Overview, ELAAA)
  - Do this for each bullet point from the question.

e.g. *In Source B, Dickens makes us feel part of the fair by using sensory imagery such as 'bellowing of speaking trumpets'. This allows the reader to more easily visualise themselves at the fair. The personification of 'the speaking trumpets' captures the liveliness of the scene. Coupled with the adverb 'gaily' in 'stalls lighted gaily' the readers' senses are awakened. The cumulative effect of the imagery evokes the lively atmosphere of the fair.*




**Q4- 20 mins**

**Planning the answer:**

19. Draw a box around the phrase that says, 'you need to refer to'. Make sure you know which lines from each source you are writing about.
20. Underline if you are being asked for differences or similarities.
21. Circle the attitude word (attitude/viewpoint/perspective/experience)
22. Draw a box around the focus: e.g. the fair
23. Split a section of your page into two. Label each side with the names of the writers
24. Note down ideas about each of the writers' attitudes about the topic
25. Underline quotations from each source to support the feelings from step 24
26. On your plan number the points in the order they appear in Source A

**When writing the answer:**

28. Write an opening sentence that clearly refers to the question
29. Write your 5 points from the plan into at least 5 **PLEA C** PLEA paragraphs (Point (feeling/emotion/viewpoint)/ Label/ Evidence / Analysis **Comparative phrase** Point (feeling/emotion/viewpoint)/ Label/ Evidence / Analysis)



**Q5- 45mins**


**Miss Morgan**

**Planning the answer: 15mins**

31. Underline the **form/audience/purpose** in the question.
32. Write the techniques for the purpose (explain, argues, persuade, instruct/advise) at the top of the paper.
33. Write the punctuation list at the top (!?,,:-)
34. **STEAL** good vocabulary from the extract you have read and think of others
35. Bullet point/mind map your ideas and then number them in the order you are going to write them in. **Think about circular structure.**
36. If it is argue or persuade, open with a rhetorical question, controversial idea or emotive imagery and return to this at the end.

**When writing the answer: 30mins**

40. Write each paragraph with an idea of which techniques for the question purpose you are going to use.
41. At the end of the paragraph cross off the techniques and punctuation you have used
42. Remember to use a semi-colon (easiest way is instead of 'so' / 'because').
43. Start each paragraph in a different way:
  - Verb: 'ing' / 'ed' word
  - Adverb: 'ly' word
  - Adjectives: describing word
  - Preposition/Place word: 'on' / 'next to' / 'near'
45. **PROOF READ** your work (5mins)
  - Read backwards to find spelling errors.
  - Read forwards to find missing words and punctuation.
46. It is okay to cross out and write a better word above a piece of dull or repeated vocabulary.



Q5 - LETTER	Q5 - ARTICLE	Q5 - Text for a LEAFLET	Q5 - Text of a SPEECH	Q5 - ESSAY
<ul style="list-style-type: none"> <li>• Dear Sir/Madam or name</li> <li>• Addresses</li> <li>• Date</li> <li>• Paragraphs</li> <li>• Yours sincerely/faithfully</li> </ul>	<ul style="list-style-type: none"> <li>• Clear/apt/original title</li> <li>• Strapline / subheading</li> <li>• Subheadings</li> <li>• Introductory paragraph</li> </ul>	<ul style="list-style-type: none"> <li>• Clear/apt/original title</li> <li>• Organisational devices such as inventive subheadings or boxes</li> <li>• Bullet points</li> </ul>	<ul style="list-style-type: none"> <li>• Clear address to audience</li> <li>• Rhetorical indicators that an audience is being addressed throughout</li> <li>• A clear sign off, e.g. 'Thank you for listening'</li> </ul>	<ul style="list-style-type: none"> <li>• An effective introduction and conclusion.</li> </ul>

Q5 - EXPLAIN	Q5 - ARGUE	Q5 - PERSUADE	Q5 - INSTRUCT / ADVISE
<ul style="list-style-type: none"> <li>• AFORESTPACK</li> <li>• range of reasons</li> <li>• range of appropriate detail</li> <li>• specific examples of different kinds to support explanation</li> <li>• range of responses to 'why'</li> <li>• range of responses to 'how'</li> <li>• different points expanded and linked</li> </ul>	<ul style="list-style-type: none"> <li>• AFORESTPACK</li> <li>• formal language</li> <li>• balanced sentences</li> <li>• people's opinions (real or made up)</li> <li>• specific examples of situations</li> <li>• range and variety of points</li> <li>• <b>countering opposing points of view</b></li> <li>• a neat conclusion</li> </ul>	<ul style="list-style-type: none"> <li>• AFORESTPACK</li> <li>• emotive language</li> <li>• apparent balance</li> <li>• mixture of first, second and third person</li> <li>• some short sentences</li> <li>• identify with audience by using 'we'</li> <li>• perhaps some attempt to shock reader into agreement</li> <li>• varied choice of a verbs and adjectives</li> <li>• some 'literary' devices such as alliteration, groups of three</li> </ul>	<ul style="list-style-type: none"> <li>• AFORESTPACK</li> <li>• formal language</li> <li>• close relationship with audience providing reasons for a course of action</li> <li>• empathy with the audience's problem</li> <li>• several suggestions about what to do</li> <li>• use of modal verbs (e.g. might, could should)</li> <li>• build the confidence of the reader</li> <li>• address the reader directly in the second person (you)</li> <li>• use imperatives (e.g. 'you should', 'make sure that you', 'be careful to')</li> <li>• raise questions and give answers</li> <li>• lead to a clear conclusion about action to be taken</li> </ul>
Because ... Another reason ... Although ... Nevertheless ... Above all else ... The first thing to do is ... Consequently ...	The most important aspect... Firstly ... Secondly ... Nevertheless ... On balance ... Despite the view that ... Another factor to be considered is ... Opponents declare ... but ...	Some people think ... Do they really think that ... In my experience ... What would the consequences be ... Common sense dictates that ... All reasonable people think ... By far the best solution would be ... I have no doubt at all that ... There are only one conclusion ...	You might be able to ... Think about ... Make sure that you ... You should be careful to ... Don't if you ... Then you could ... I understand that you feel ... Don't worry if ... One solution might be to ... Another possibility would be to ... If you don't then you could be careful to ... In order to avoid ... I think you should ... Be confident about ... If on the other hand, then ...

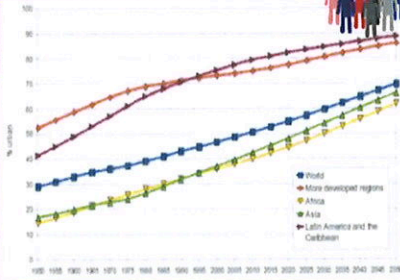


## What is Urbanisation?

This is an increase in the amount of people living in urban areas such as towns or cities. In 2007, the UN announced that for the first time, more than 50% of the world's population live in urban areas.

### Where is Urbanisation happening?

Urbanisation is happening all over the world but in LICs and NEEs rates are much faster than HICs. This is mostly because of the rapid economic growth they are experiencing.



## Causes of Urbanisation

### Rural - urban migration (1)

The movement of people from rural to urban areas.

#### Push

- Natural disasters
- War and Conflict
- Mechanisation
  - Drought
- Lack of employment

#### Pull

- More Jobs
- Better education & healthcare
- Increased quality of life.
- Following family members.

### Natural Increase (2)

When the birth rate exceeds the death rate.

#### Increase in birth rate (BR)

- High percentage of population are child-bearing age which leads to high fertility rate.
- Lack of contraception or education about family planning.

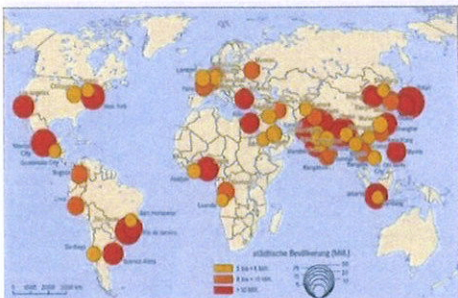
#### Lower death rate (DR)

- Higher life expectancy due to better living conditions and diet.
- Improved medical facilities helps lower infant mortality rate.

## Types of Cities

### Megacity

An urban area with over 10 million people living there.



More than two thirds of current megacities are located in either NEEs (Brazil) and LICs (Nigeria). The amount of megacities are predicted to increase from 28 to 41 by 2030.

## Sustainable Urban Living

Sustainable urban living means being able to live in cities in ways that do not pollute the environment and using resources in ways that ensure future generations also can use them.

### Water Conservation

This is about reducing the amount of water used.

- Collecting rainwater for gardens and flushing toilets.
- Installing water meters and toilets that flush less water.
- Educating people on using less water.

### Energy Conservation

Using less fossil fuels can reduce the rate of climate change.

- Promoting renewable energy sources.
- Making homes more energy efficient.
- Encouraging people to use energy.

### Creating Green Space

Creating green spaces in urban areas can improve places for people who want to live there.

- Provide natural cooler areas for people to relax in.
- Encourages people to exercise.
- Reduces the risk of flooding from surface runoff.

### Waste Recycling

More recycling means fewer resources are used. Less waste reduces the amount that eventually goes to landfill.

- Collection of household waste.
- More local recycling facilities.
- Greater awareness of the benefits in recycling.

## GEOGRAPHY: Unit 2a

AQA

# Urban Issues & Challenges

## Sustainable Urban Living Example: Freiburg

### Background & Location

Freiburg is in west Germany. The city has a population of about 220,000. In 1970 it set the goal of focusing on social, economic and environmental sustainability.



### Sustainable Strategies

- The city's waste water allows for rainwater to be retained.
- The use of sustainable energy such as solar and wind is becoming more important.
- 40% of the city is forested with many open spaces for recreation, clean air and reducing flood risk.

## Integrated Transport System

This is the linking of different forms of public and private transport within a city and the surrounding area.

## Brownfield Site

Brownfield sites is an area of land or premises that has been previously used, but has subsequently become vacant, derelict or contaminated.

## Traffic Management

Urban areas are busy places with many people travelling by different modes of transport. This has caused urban areas to experience different traffic congestion that can lead to various problems.

### Environmental problems

- Traffic increases air pollution which releases greenhouse gases that is leading to climate change.



### Economic problems

- Congestion can make people late for work and business deliveries take longer. This can cause companies to loose money.

### Social Problems

- There is a greater risk of accidents and congestion is a cause of frustration. Traffic can also lead to health issues for pedestrians.

## Congestion Solutions

- Widen roads to allow more traffic to flow easily.
- Build ring roads and bypasses to keep through traffic out of city centres.
- Introduce park and ride schemes to reduce car use.
- Encourage car-sharing schemes in work places.
- Have public transport, cycle lanes & cycle hire schemes.
- Having congestion charges discourages drivers from entering the busy city centres.



## Traffic Management Example: Bristol

In 2012 Bristol was the most congested city in the UK. Now the city aims to develop it's integrated transport system to encourage more people to use the public transport. The city has also invested in cycle routes and hiring schemes.



## Greenbelt Area

This is a zone of land surrounding a city where new building is strictly controlled to try to prevent cities growing too much and too fast.

## Urban Regeneration

The investment in the revival of old, urban areas by either improving what is there or clearing it away and rebuilding.



## Urban Change in a Major UK City: London case study



Location and Background	City's Importance
<p>London is a city in South East England. It is the capital city of the UK. The population of the city is 8 million people making it the largest in the UK. The city has grown over many centuries and was important in roman times. Until 1945 it was the most important trading city on earth.</p> <p>Its population fell after the WW2 as older industries closed and ships became bigger meaning they could no longer navigate the Thames river into London's docklands. Since the 1990's its population has begun to grow again</p>	<ul style="list-style-type: none"> <li>The city enjoys a large sporting heritage with famous athletics and football clubs.</li> <li>London is the cultural capital and is famous for its West end theatre production, Art galleries, mixed ethnic and cultural heritage and for being the centre of international financial institutions in Europe and the world</li> <li>London has a thriving community of international students studying at universities in the city such as UCL and Goldsmiths</li> <li>It is the Fastest growing city in the UK economically and by population</li> </ul>

Migration to London	City's Opportunities
<p>London has always been an important trading centre in the UK, Europe and the world. During the industrial revolution, the population dramatically increased with people migrating from rural communities to work in the docks, markets and factories in London</p> <p>After World War 2 the UK government invited people from the commonwealth countries to come and live and work in the UK to help the regeneration of the economy and infrastructure after the war. International migrants from across the world arrived from Pakistan, India and the Caribbean nations including Jamaicans (the Windrush generation) came to work in London. Most settled in poorer central areas like Notting hill and Hackney.</p> <p>More recently, refugees have arrived from Syria, Iraq and North African countries like Nigeria and Ghana. London has attracted thousands of students from the UK &amp; abroad.</p>	<p><b>Social:</b> London has many different cultural attractions such as the theatres like the National Theatre, museums such as the Natural history museum, art galleries such as the Tate modern and the National. Also many Premier league football clubs are found in London such as Chelsea, Arsenal, Tottenham as well as national sporting arenas such as Wembley and Twickenham (rugby) and the Queen Elizabeth's Olympic stadium (Athletic and football). Shopping malls such as Westfield are very popular with shoppers. The centre of Government and Parliament are found in Westminster.</p> <p><b>Economic:</b> The retail sectors contribute to thousands of jobs. The Universities and advanced manufacturing adds contribute to the city's economy. International financial institutions reside in Central London and Canary wharf. 5% of global international finance passes through London every year</p> <p><b>Environmental:</b> London has many green spaces/parklands in its central areas. These include Green park, Hyde Park, Regents Park. London is only an hours drive to the South Downs National Park where people can enjoy open countryside and walking activities.</p>

London's City Challenges	Regeneration of East London, The London Olympics 2012
<p><b>Social:</b> House prices have increased along with greater house shortages. A third of households live in the 10% of the most deprived wards in the UK.</p> <p><b>Economic:</b> Attracting skilled workers remains a challenge because house prices outweigh people incomes to afford housing. BREXIT has created uncertainty in the financial sector and some banks such as HSBC and industries such as Air Bus (aircraft) are considering leaving the UK as a result of the concerns over trade deals with the EU. Improvements to transport infrastructure such as East coast mainline is hoped to attract investment</p> <p><b>Environmental:</b> Urban sprawl has led to increased pressure and decline of greenfield sites around the city.</p>	<p>Aims: East London wanted to attract investment from private investment, the government and Lottery funds so that there were more opportunities for improvements in affordable housing, business investment in the area and job creation as well as improvements in health and education opportunities. Also the projects aim to improve public spaces with more green urban environments.</p> <p>Main features: Brownfield sites and derelict buildings pulled down, £50 million invested on its train station to improve connections, The total bill for the Olympics was £8.7 billion.</p> <p>There has been strong debate as to whether the Olympics were a success or failure</p>



## Urban Change in a Major NEE City: Mumbai, West coast of India



Location and Background	City's Importance
<p>Mumbai is a coastal city situated in the West of India in Maharashtra state. It is built on a peninsula and is the biggest city in India (16 + million)</p> <p>The city has seen rapid growth over the past 50 years. Most original growth occurred on the Peninsula but the city has now expanded to the north and East</p>	<ul style="list-style-type: none"> <li>Mumbai is the commercial and financial capital of India and handles 60% of India's sea trade. It is the HQ to many of India's internationally based companies such as GlaxoSmithKline, Volkswagen, Disney, and Citi group banking and has the main Indian stock market as well as being the busiest port and airport in India.</li> <li>It is the centre of the biggest cultural industry – Bollywood – India's film industry. It is characterised by back street small business and international banking and financial services.</li> </ul>



Migration to Mumbai	City's Opportunities
<p>The city was an important trading city when Britain was India's colonial master. Mumbai was called Bombay by the British at this time.</p> <p>In recent decades Mumbai's population has grown rapidly due to millions of people migrated from rural areas that have suffered from drought, lack of services and unemployment to Mumbai. People do this to search for a better quality of life.</p> <p>This expanding population has resulted in the rapid urbanisation of Mumbai.</p> <p>The average age of migrants is 20-21 years old. Natural increase is a significant component of population growth.</p>	<p><b>Social:</b> Standards of living are gradually improving as investment and incomes improve</p> <p><b>Economic:</b> Mumbai has one of the highest incomes per person in the country. The city has various types of employment including retail, banking, call centres and back street manufacturing (Sweat shops) and Pottery (Kumbawadas in Dharavi).</p> <p><b>Environmental:</b> With investment in new housing and infrastructure Mumbai and transport Mumbai aims to reduce water and waste pollution</p>

City Challenges	Self-help schemes – Dharvi rehabilitation Project
<p><b>Social:</b> There is a severe shortage of housing, schools and healthcare centres available. Large scale social inequality, is creating tensions between the rich and poor.</p> <p><b>Economic:</b> The rise of informal jobs with low pay and no tax contributions. There is high employment in slums like Dharavi</p> <p><b>Environmental:</b> Slums are established around the city, typically on unfavourable land, such as marsh land or near to industrial sites</p>	<ul style="list-style-type: none"> <li>The authorities have provided basic materials to improve people's homes with safe electricity and sewage pipes.</li> <li>Government has demolished houses and created new estates.</li> <li>Greater investment in new road and rail network to reduce pollution and increase connections between rich and poor areas.</li> <li>Slum electrification project- aims to provide communities with electricity rather than people using bottled gas</li> </ul>



## Command Words and Instructions

Lee el artículo / el texto	Read the article / the text	Escucha el discurso	Listen to the discussion
Decide si las frases son verdaderas o falsas	Decide if the phrases are true or false.	Copia y completa la tabla	Copy and complete the table
Trouvez les quatres phrases varies.	Find the four correct statements.	Describe la foto	Describe the picture.
Escribe las letras correctas en las casillas.	Write the correct letters in the boxes.	Escucha (otra vez)	Listen (again)
Completa las frases en español	Complete the phrases in Spanish.	Traduce las frases	Translate the phrases
Escribe el porcentaje correcto	Write the correct percentage.	Escribe un texto y menciona	Write a text and mention

## Idioms and Flash Spanish

Ser un pedazo de pan	To be a very nice person
Ser pan comido	To be a piece of cake
Ir al grano	To get to the point
A lo hecho, pecho	What is done is done
Dar calabazas	To reject someone
Montar el numerito	To make a scene
ser como perros y gatos	To fight like dogs and cats

## Modules / Themes

- o 1 Me, my family and friends
- o 2 Technology and media
- o 3 Hobbies, food and festivals
- o 4 Home, town and region
- o 5 Travel and tourism
- o 6 Education and social issues
- o 7 Career and life choices
- o 8 Social and global issues

## Literacy Mat: Key Stage 4 Spanish

### Time Frames and Verbs

Text	Ayer La semana pasada El mes pasado El año pasado El fin de semana pasado En el pasado Las vacaciones pasadas	En jugué sabía estaban comí fui	ahí estaba estaba había era	ahí estaba estaba había era	había compré manché sabía dormí	hago estoy nacho me levanto quiero
Present	hoy Esta semana Este mes El fin de semana Por la mañana Todos los días Normalmente	voy juego visito estoy como soy	salgo veo cojo comprendo bebo tengo	llego compro escribo acabo duermo debo	hago estoy nacho me levanto quiero	
Future	mañana La semana que viene El año que viene El fin de semana que viene En el futuro	voy a ir voy a ver voy a visitar voy a estar. voy a comer. seré	voy a salir voy a comprar voy a coger voy a comprender. voy a beber. tendré	voy a llegar voy a hacer voy a escribir voy a acabar. voy a dormir deberé	voy a encontrar voy a nadar voy a levantarme podré querré	

### Opinions and Reasons

Me encanta .....	Porque	encuentro que es	interesante
Me gusta .....		pienso que es	divertido
Me gusta mucho .....		lo encuentro	interesante
Me gusta .....		en mi opinión es	aburrido
No me gusta .....		creo que es	aburrido
No me gusta nada .....		considero que es	interesante
Prefero .....			divertido
Odio .....			aburrido
No soporto .....			interesante
No aguanto .....			aburrido

### Conjunctions

y	and
pero	but
cuando	when
Sin embargo	however
que	what/ which
No obstante	nevertheless
luego	then
después	later
si	if
Así que	so / therefore
también	also
Por un lado	on one hand
Por otro	on the other hand

### Adverbs

afortunadamente	fortunately
desafortunadamente	unfortunately
primeramente	first of all
normalmente	usually
generalmente	generally
a menudo	often
después	next
de vez en cuando	from time to time
finalmente	finally
a veces	sometimes
nunca	never
regularmente	regularly

## Grammar Terms

Grammar term	Example (e.g. walked)	Subject	The person or thing doing the action (e.g. I walked)
Common noun	A thing e.g.: una ciudad	Direct object	The person or thing directly affected by the action e.g.: I walked <b>the dog</b>
Pronoun	Replaces a noun E.g.: él / ella	Indirect object	The person or thing indirectly affected by the action e.g.: I gave a bone to <b>the dog</b>
Adjective	Describes a noun e.g.: azul	Negative	Usually to make a verb negative. e.g.: <b>No</b> me gusta el chocolate
Verb	A doing word for an action or state e.g.: jugar, ser	Comparative	To say something is bigger / smaller than something else. eg: <b>mas que / menos que</b>
Adverb	Describes an action e.g.: rápidamente, regularmente	Superlative	To say something is the biggest / smallest eg: <b>le plus grand</b>
Infinitive	The name of a verb e.g.: cantar, beber, dormir	Possessive pronoun	My / your/ his / her etc. <b>mi mis</b> <b>tu tus</b> <b>su sus</b>
Tense	A change in the verb to show when the action is happening e.g.: jugué, -I played	Subordinate clause	A part of a sentence which is dependent on another, main clause. eg: I would buy a boat <b>if I were rich.</b>
Conjugate	To make the verb fit the subject – e.g.: juego, juegas	Demonstrative pronoun	How to say, this, that these and those etc. E.g. <b>este libro / esta casa / estos niños</b>
Paradigm	The pattern of a whole verb in a given tense. e.g.: yo juego tu juegas él/ ella juega	Conjunction	A word used to join two clauses in a sentence. E.g. Me gustan los gatos <b>porque</b> son bonitos
		False friends	A word that looks or sounds like English but does not mean the same. E.g. Actualmente. = currently

## Punctuation

Full stop	Comma	Colon	Semi-colon	Question mark	Exclamation mark	Hyphen	Inverted Commas	Brackets	Apostrophe	Acute accent	Double letter	Umlaut / dieresis
,	,	:	;	?	!	–	“ ”	()	'	Á, é, í, ó, ú	ll	ï ü

To start off:	Describing a Picture	What are they doing?
En la imagen... En la foto... Hay... Veo... Se puede ver... La foto muestra...	In the image In the photo There is/ are I see You can see The photo shows...	Está(n) hablando Está(n) discutiendo Está(n) riendo Está(n) trabajando Está(n) jugando
En primer plano... Al fondo... A la izquierda... A la derecha... Cerca de... Delante de...	In the foreground In the background to the left to the right close to in front of	They are talking They are arguing They are smiling They are laughing They are working They are playing
	Describing people Parece(n)... Contente(a)(s) Triste(a)(s) Cansado(a)(s) Enfadado(a)(s)	
	What's the scene? Un hombre/una mujer Unas personas Mucha gente Unos edificios Unos árboles Una escena de...	



## Command Words and Instructions

Read the article	Read the article	Read the article	Read the article
Décidez si les phrases sont vraies ou fausses.	Decide if the phrases are true or false.	Mentionnez quatre choses.	Mention four things.
Trouvez les quatre phrases vraies.	Find the four correct statements.	Décrivez votre chanteur préféré.	Describe your favourite singer.
Écrivez la bonne lettre dans les cases.	Write the correct letter in the boxes.	Répondez à la question.	Answer the question.
Complétez les phrases en français.	Complete the phrases in French.	Parlez en français.	Speak in French.
Choisissez la bonne réponse	Choose the correct answer.	Discutez avec un ami.	Discuss with a friend.

## Idioms and Flash French

Je suis saigné comme une éponge.	I am as green as grass.
J'en ai ras le bol.	I am fed up with it.
Ça marche.	That works for me / It's fine/ OK.
Pas de problème.	No worries.
Il fait un froid de canard.	It's freezing.
Revenons à nos moutons.	Anyway, as I was saying.....
J'ai le cafard.	I've got the blues / I'm down.

## Modules / Themes

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## Literacy Mat: Key Stage 4 French

### Time Frames and Verbs

Time	Verb	je suis allé(e)	je suis parti(e)	je suis arrivé(e)	je suis
Past	la semaine dernière	l'ai vu(e)	l'ai regardé(e)	l'ai acheté(e)	l'ai fait
	l'année dernière	l'ai vu(e)	l'ai regardé(e)	l'ai acheté(e)	l'ai fait
	le weekend dernier	l'ai vu(e)	l'ai regardé(e)	l'ai acheté(e)	l'ai fait
	il y a deux jours	l'ai vu(e)	l'ai regardé(e)	l'ai acheté(e)	l'ai fait
Present	aujourd'hui	je vais	je pars	j'arrive	je fais
	cette semaine	je joue	je regarde	j'achète	je trouve
	cette année	je visite	je prends	j'écris	je nage
	le weekend	je loge	je comprends	je finis	je me lève
Future	le matin	je mange	je bois	je dors	je me lève
	tous les jours	je suis	j'ai	je dois	je peux
	d'habitude	je vais aller	je vais partir	je vais arriver	je vais faire
	demain	je vais jouer	je vais regarder	je vais acheter	je vais trouver

### Opinions and Reasons

J'adore.....	parce que / qu'à cause de	je trouve que c'est	intéressant
Je préfère.....		je pense que c'est	utile
J'aime.....		je te / la / le trouve	difficile
Je n'aime pas.....		à mon avis c'est	simple
Je déteste.....		d'accord, moi c'est	drôle
J'ai honte (de).....		non, moi c'est	ennuyeux
Je ne supporte pas.....			agaçant
			déprimant
			amusant
			surprenant

### Conjunctions

et	and
mais	but
quand	when
cependant	however
qui	who / which
néanmoins	nevertheless
puis	then
ensuite	next
si	if
donc	so / therefore
alors	then / so
par contre	on the other hand
d'un côté...	on one hand
et de l'autre.....	on the other hand

### Adverbs

heureusement	fortunately
malheureusement	unfortunately
d'abord	first of all
normalement	normally
d'habitude	usually
généralement	generally
souvent	often
ensuite	next
de temps en temps	from time to time
finalement	finally
parfois	sometimes
jamais	never
régulièrement	regularly

## Grammar Terms

French term	English	French	English
Common noun	A thing eg: une ville	Direct object	The person or thing directly affected by the action eg: I walked <b>the dog</b> .
Pronoun	Replaces a noun eg: il / elle	Indirect object	The person or thing directly affected by the action eg: I gave a bone to <b>the dog</b> .
Adjective	Describes a noun eg: bleu	Negative	Usually to make a verb negative. eg: Je <b>n'aime pas</b> le chocolat.
Verb	A doing word for an action or state eg: jouer, être	Comparative	To say something is bigger / smaller than something else. eg: plus grand / petit que
Adverb	Describes an action eg: rapidement, régulièrement	Superlative	To say something is the biggest / smallest eg: le plus grand
Infinitive	The name of a verb eg: jouer, être, finir, vendre	Possessive pronoun	My / your / his / her etc mon ma mes ton ta tes son sa ses
Tense	A change in the verb to show when the action is happening eg: j'ai joué, - I played	Subordinate clause	A part of a sentence which is dependent on another, main clause. eg: I would buy a boat <b>if I were rich</b> .
Conjugate	To make the verb fit the subject -- eg: je joue / tu joues	Demonstrative pronoun	How to say, this, that these and those etc Eg: ce livre / cette femme / ces enfants
Paradigm	The pattern of a whole verb in a given tense. eg: je joue tu joues. il / elle / on joue	Conjunction	A word used to join two clauses in a sentence. Eg: J'aime les chats <b>parce qu'ils</b> sont mignons.
		Faux ami	A word that looks or sounds like English but does not mean the same. Eg. Bonne <b>journée</b> . = Have a good day

## Punctuation

Full stop	Comma	Quotation	Acute	Grave	
Comma	,	Inverted Commas	“ ”	Acute accent	é
Colon	:	Brackets	( )	Grave accent	à è ì ò ù
Semi-colon	;	Apostrophe	’	Circumflex Accent	â ê î ô ú
Question mark	?	A new paragraph is used when you change <b>Time, Place, Topic or Person</b>		Cedilla	ç
Exclamation mark	!			Umlaut / tréma	ë ü

## Describing a Picture

Sur la photo	il y a	une parade.
À gauche		des spectateurs.
À droite		un groupe de gens / filles / garçons / musiciens.
Au centre		un groupe d'enfants.
Ils/Elles sont	dans la rue.	
	en ville.	
Ils/Elles	marchent / dansent / jouent d'un instrument.	
Ils/Elles portent des vêtements	traditionnels / colorés / bizarres / incroyables.	
	blancs / bleus / noirs / ...	
Ils/Elles	portent des drapeaux.	



## Command Words and Instructions

Les den Bericht.	Read the article.	Hör es.	Listen.
Entscheide ob die Sätze richtig oder falsch sind.	Decide if the phrases are true or false.	Nenne vier Dinge.	Mention four things.
Finde die vier richtigen Sätze.	Find the four correct statements.	Beschreib deinen Lieblingsänger.	Describe your favourite singer.
Schreib die richtigen Buchstaben in die Kästen.	Write the correct letter in the boxes.	Beantworte die Frage.	Answer the question.
Was passt zusammen?	What matches?	Sprich auf Deutsch.	Speak in French.
Welche Antwort ist richtig?	Which answer is correct?	Diskutiere mit einem Freund.	Discuss with a friend.

## Idioms and Flash German

Ich drücke dir die Daumen.	I'm waving my fingers crossed for you.
Rede nicht um den heißen Brei herum.	Get to the point.
Ich bin fix und fertig.	I'm exhausted.
Alles Banane!	Everything's fine!
Ich verstehe nur Bahnhof.	I don't get it.
Hast du einen Vogel?	Are you mad?
Es geht mir auf den Wecker.	It annoys me.

## Modules / Themes

- 1 Me, my family and friends
- 2 Technology and media
- 3 Hobbies, food and festivals
- 4 Home, town and region
- 5 Travel and tourism
- 6 Education and social issues
- 7 Career and life choices
- 8 Social and global issues

## Literacy Mat: Key Stage 4 German

### Time Frames and Verbs

Time	Verbs	haben	essen	sein
Present	Heute Diese Woche Dieses Jahr Dieses Wochenende Heute Morgen Jeden Tag Normalerweise	spiele ich gebe ich sehe ich höre ich lese ich kaufe ich helfe ich	esse ich trinke ich wohne ich will ich darf ich kann ich mache ich	fahre ich gehe ich fliege ich schwimme ich laufe ich bleibe ich möchte ich
Future	Morgen Nächste Woche Nächstes Jahr Nächstes Wochenende In der Zukunft Morgen früh	werde ich spielen werde ich geben werde ich sehen werde ich hören werde ich lesen werde ich kaufen werde ich helfen	werde ich essen werde ich trinken werde ich wohnen werde ich wollen werde ich dürfen werde ich können werde ich machen	werde ich fahren werde ich gehen werde ich fliegen werde ich schwimmen werde ich laufen werde ich bleiben

### Opinions and Reasons

ich liebe ..... ich bevorzuge ..... ich mag ..... ich mag ..... nicht ich hasse ..... ich interessiere mich für ..... ich bin gegen ..... ich bin für .....	denn	ich finde es ich danke es ist ich glaube es ist meiner Meinung nach ist es	interessant wichtig besser schön lang interessant schwierig aufregend voll wunderbar
!!! Remember!!! e.g.: ..., weil..... ist.			

### Conjunctions

und - and  
denn - because  
aber - but  
Verb 2<sup>nd</sup>!

Jedoch - however  
deshalb - therefore  
deswegen - for that reason  
auch - also  
Verb to end!

obwohl - although  
dass - that  
weil / da - because  
wenn - if  
falls - in case

### Adverbs

glücklicherweise fortunately  
leider unfortunately  
zuerst first of all  
normalerweise normally / usually  
meistens mostly  
im Allgemeinen generally  
oft often  
Ab und zu from time to time  
immer always  
manchmal sometimes  
nie never  
selten rarely

## Grammar Terms

English term	German / English	German	The person or thing directly affected by the action eg. Ich kaufe ein Eis.
Common noun	A thing eg.: eine Stadt	Direct object	The person or thing directly affected by the action eg.: Ich kaufe ein Eis
Pronoun	Replaces a noun eg.: er / sie / es	Indirect object	The person or thing directly affected by the action eg.: Ich kaufe dem Kind ein Eis
Adjective	Describes a noun eg.: blau / klein / nett	Negative	Usually to make a verb negative. eg.: Ich esse nicht gern Schokolade.
Verb	A doing word for an action or state eg.: spielen / machen	Comparative	To say something is bigger / smaller than something else eg.: größer / kleiner als
Adverb	Describes an action eg.: normalerweise, meistens	Superlative	To say something is the biggest / smallest eg.: am größten / am kleinsten
Infinitive	The name of a verb eg.: spielen, machen, gehen	Possessive pronoun	My / your / his / her etc. mein meine mein dein deine dein sein seine sein
Tense	A change in the verb to show when the action is happening eg.: Ich habe gespielt = I played	Subordinate clause	A part of a sentence which is dependent on another, main clause. eg.: Ich würde nach Spanien fliegen, wenn ich Geld hätte.
Conjugate	To make the verb fit the subject eg.: Ich spiele / du spielst	Demonstrative pronoun	How to say, this, that, these and those etc. eg.: dieser Hund/ diese Frau/ dieses Buch
Paradigm	The pattern of a whole verb in a given tense. eg.: Ich spiele. du spielst. er/sie/es/ man wir spielen ihr spielt spielt sie/Sie spielen	Conjunction	A word used to join two clauses in a sentence. eg.: Ich liebe die Katze, weil sie niedlich ist.
		Falsche Freunde	A word that looks or sounds like English but does not mean the same. eg.: Rente = pension / Chef = boss / Bank = bench / Gift = poison

## Punctuation

Punctuation	Symbol	Function	German	Umlaut
Comma	,	Inverted Commas	“ ”	
Colon	:	Brackets	( )	
Semi-colon	;	Apostrophe	'	
Question mark	?	A new paragraph is used when you change <u>Time</u> , <u>Place</u> , <u>Topic</u> or <u>Person</u> .	Schafes s	ß
Exclamation mark	!		Umlaut	ä ö ü

## Describing a Picture



Sur la photo	il y a	une parade.
À gauche		des spectateurs.
À droite		un groupe de gens / filles / garçons / musiciens.
Au centre		un groupe d'enfants.
Ils/Elles sont	dans la rue. en ville.	
Ils/Elles	marchent / dansent / jouent d'un instrument.	
Ils/Elles portent des vêtements	traditionnels / colorés / bizarres / incroyables. blancs / bleus / noirs / ...	
Ils/Elles	portent des drapeaux.	

In dem Foto	gibt es	eine Straße
Auf der linken Seite		einen Strand
Auf der rechten Seite		viele Gebäude
In der Mitte		einen Wald
Im Vordergrund		Berge
Im Hintergrund		eine Gruppe von Leuten / Jungen / Mädchen / Jugendlichen
Sie sind	in der Stadt / auf dem Land / am Meer.	
Sie	laufen / tanzen / spielen.	
Sie	tragen	moderne / bunte / sportliche Kleridung.
Sie sehen	glücklich / traurig / gelangweilt aus.	
Ich finde / denke	es ist toll / schön/ interessant / unterhaltsam / spaßig / aufregend / langweilig.	



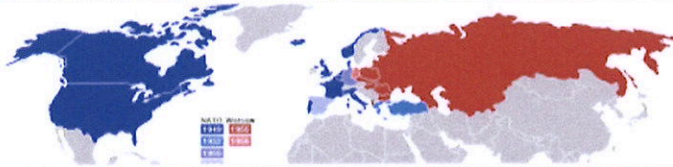
# Describing a photo

## PALM-O

<b>P – Physical description</b>	<b>Auf dem Foto gibt es... (drei Personen)</b>
<b>A – Action</b>	Sie ... sehen fern / spielen Rugby...
<b>L - Location</b>	Es ist in / Es befindet sich in... einer Schule / einem Park.
<b>M – Mood</b>	Sie sehen glücklich aus usw.
<b>O - Opinion</b>	Ich mag... / Ich finde... / Ich denke... - Say something you like about it + give a reason




### Knowledge Organiser: Origins of the Cold War 1941-1956

<p>The Cold War refers to the period of tension between the United States of America (USA) and the Soviet Union (USSR). The expression is used to describe the 'frosty tension' between the two superpowers that lasted for nearly 50 years. In this unit you will study how this conflict developed and the early crises.</p>		Chronology: What happened on these dates?		Vocabulary: Define these keywords:	
		1943	<b>Tehran Conference:</b> the 'big three' met to discuss the post-World War Two situation in Europe.	<b>Soviet Union</b>	Short for USSR (Union of Soviet Socialist Republics). Consisted of Russia, Belarus, Ukraine, Poland and others.
February 1945	<b>Yalta Conference:</b> the 'big three' agreed to divide Germany into 4 zones.				
Summarise your learning:		July 1945	<b>Potsdam Conference:</b> Truman's differences with Stalin led to the start of tension.	<b>Ideology</b>	A set of shared beliefs. The USA believed in capitalism, whilst the USSR was ran by communism.
<b>Topic 1:</b> Ideological differences	The conflict grew initially from ideological differences. The Soviet Union was a communist country whose government and economic system was at odds with that of capitalist democratic America.	1947	President Truman issued the ' <b>containment</b> ' policy and agreed to the ' <b>Marshall Plan</b> '.		
		<b>Topic 2:</b> Atomic bomb and the arms race	When the USA dropped the world's first atomic bomb on Japan, it changed the nature of warfare forever. The threat of atomic warfare between the 2 superpowers led to 'mutually assured destruction' (MAD), the threat of mutual annihilation. This led to an arms race between the 2 superpowers, where they competed to have the most nuclear weapons.	1947-49	<b>Cominform</b> was set up by the USSR to create a networking zone for the communist countries. Then, <b>Comecon</b> was created, a financial plan that would also financially aid east Europe.
1948-49	The <b>Berlin Blockade</b> and the <b>Berlin airlift</b> .				
<b>Topic 3:</b> Soviet expansion	Keen to form a buffer zone, the USSR began to expand into eastern Europe, targeting Poland, Hungary and Czechoslovakia. The West became increasingly alarmed at Soviet expansion. Churchill referred to the expansion as an 'Iron Curtain' forming in Europe. The USA followed its containment policy and sent financial aid (\$17billion) through the Marshall Plan.	1949	<b>NATO</b> formed, which stands for the North Atlantic Treaty Organisation. The aim was to create a military alliance between the Western powers.	<b>Communism</b>	Communists believe that all property and businesses should belong to the state and shared equally.
		1949	<b>NATO</b> formed, which stands for the North Atlantic Treaty Organisation. The aim was to create a military alliance between the Western powers.		
<b>Topic 4:</b> Berlin crisis and the Hungarian Uprising	The differences over what to do with Germany led to the first major Cold War crisis in Berlin, when Stalin ordered a blockade into West Germany. The Allies responded with an airlift, which led to Stalin ending the Berlin blockade. Then, in 1956, the Hungarians held an uprising against Rakosi's brutal rule. The USSR responded by sending in tanks, shooting on protestors and reversing Imre Nagy's attempts at reform, which worsened its relations with the West.	1955	The <b>Warsaw Pact</b> formed, which was a defensive military alliance of the USSR and its Soviet satellite states.	<b>Veto</b>	To forbid a decision to pass at the UN's security council.
		1956	The <b>Hungarian Uprising</b> .		
				<b>United Nations</b>	The international organisation that is meant to promote peace between countries.
		<b>Do you know these people?</b>			
		<b>Winston Churchill</b>	Prime Minister of Britain from 1940-45 and then 1951-55.	<b>Superpower</b>	A country which has great power and influence globally.
		<b>Theodore Roosevelt</b>	US president from 1933-1945.		
		<b>Joseph Stalin</b>	The leader of the USSR from 1922-1953.	<b>Nuclear Deterrent</b>	Something that discourages someone from doing something e.g. not using nuclear weapons in order to not have nuclear weapons used against you.
		<b>Harry Truman</b>	US president from 1945-1953.		
				<b>Satellite state</b>	Countries under the control and authority of another state e.g. the USSR.

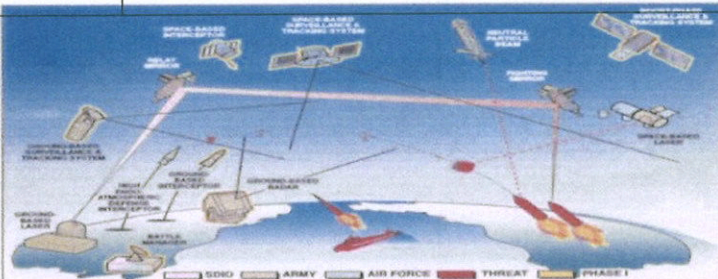



**Knowledge Organiser: Cold War Crises 1958-1970**

<p>From 1958 to 1970, the Cold War escalated dramatically. There were three crises: in 1961, the Soviet Union built the Berlin Wall, separating Berlin into east and west. Then, the 2 superpowers almost came to the point of a nuclear war during the Cuban Missile Crisis. Finally, the third crisis was over Czechoslovakia, when the Prague Spring led to a Soviet invasion that angered the West.</p>		Chronology: What happened on these dates?		Vocabulary: Define these keywords:		
		1958	Khrushchev's Berlin Ultimatum was issued.	<b>Sphere of influence</b>	A region over which a powerful country exerts unofficial but significant political, military, and economic domination.	
1959	Fidel Castro successfully took control of Cuba following the Cuban Revolution.	<b>Summit</b>	An official meeting between heads of government.			
<b>Summarise the 3 key Cold War crises:</b>			1960-61	Paris and Vienna Summits witnessed the breakdown of US-USSR relations.	<b>Invasion</b>	The hostile takeover of a country using force.
<b>Topic 1:</b> Berlin Crisis 1961	<p>In 1958, Khrushchev issued the 'Berlin Ultimatum' in which he accused the Allies of breaking their agreement at Potsdam about Germany's future. The USA did not want to go to war over Berlin and entered talks with the Soviet at the Paris and Vienna Summits, both of which ended in only increasing tension between the 2 superpowers. In August of 1961, the USSR began constructing a 3.6m high wall dividing Berlin permanently. A standoff ensued at Checkpoint Charlie, in which both sides pointed their tanks at each other. After careful negotiations behind the scenes, the crisis was averted but the wall remained standing. The Berlin Wall remained a symbol of physical and ideological tension until it came down in 1989.</p>	April 1961	Bay of Pigs invasion: US President Kennedy attempted to overthrow Castro by using Cuban exiles. The invasion was a failure and embarrassment for the USA.	<b>Ultimatum</b>		A demand whose fulfilment is requested in a specified period of time and which is backed up by a threat to be followed through.
		August - October 1961	Soviet Union began constructing the Berlin Wall, dividing the city into east and west. The crisis at Checkpoint Charlie was narrowly avoided.		<b>CIA</b>	The USA's Central Intelligence Agency, used for foreign policy events.
		22 <sup>nd</sup> -28 <sup>th</sup> October 1961	Cuban Missile Crisis: the USA and the USSR stood on the brink of nuclear war over the missile crisis in Cuba. A solution is agreed upon and nuclear war was avoided.			<b>La Brigada 2506</b>
		<b>Topic 2:</b> Cuban Missile Crisis	<p>Following the Cuban Revolution in which Cuba became closely aligned to the Soviet Union, the USA greatly worried that the American sphere of influence was being tested. President Kennedy attempted to overthrow Castro during the Bay of Pigs invasion, using 1,500 Cuban exiles trained by the CIA. The invasion failed and was an embarrassment for the USA. Tension reached a climax in 1962 when the Soviet Union began sending nuclear ballistic missiles to Cuba which had a radius that covered the majority of the east, south and north coast of the USA. Tense negotiations ensued between Kennedy and Khrushchev for 13 days; in the end, the Soviet Union agreed to remove missiles from Cuba if the US removed theirs from Turkey. Lastly, a 'hotline' was set up between Moscow and Washington DC to encourage diplomacy and avoid future disasters.</p>	1963	The Limited Test Ban Treaty was signed by the USA and the USSR, agreeing to stop testing atomic weapons in the atmosphere.	
Jan - Aug 1968	The Prague Spring: a set of reforms in Czechoslovakia that caused concern for the Soviets.					
Aug 1968	The Soviet Union invaded Czechoslovakia.					
<b>Do you know these people?</b>						
<b>Topic 3:</b> Czechoslovakia 1968	<p>The Soviet invasion of Czechoslovakia in 1968 occurred as a result of a series of reforms known as the 'Prague Spring' and it led to the Brezhnev Doctrine. The invasion severely tested relations again between the east and west. The hard-line communist Czech leader Novotny was unpopular. Dubcek challenged his leadership and introduced reforms: end of press censorship, reducing secret police, new trade with West Germany and free speech. Worried that these changes would challenge the stability of the Warsaw Pact, Brezhnev sent in thousands of troops and tanks, arresting the reformers and ending the country's moves towards democracy. The USSR justified this using the Brezhnev Doctrine which declared that the USSR had the right to invade one of their satellite states if they were threatening the stability of eastern Europe.</p>	<b>JFK</b>	John Fitzgerald Kennedy: President of the USA from 1961-63	<b>Brinkmanship</b>	<p>Pushing agreements to the point where there is a strong risk of war. Used to describe Kennedy and Khrushchev during the Cuban Crisis.</p>	
		<b>Nikita Khrushchev</b>	Leader of the Soviet Union from 1953-1964.			
		<b>Leonid Brezhnev</b>	Leader of the Soviet Union from 1964-1982.	<b>Doctrine</b>	<p>A belief or philosophy set out by politicians.</p>	
		<b>Alexander Dubcek</b>	Instigator of the Prague Spring and wanted Czechoslovakia to have more capitalist-leaning policies.			
				<b>Berlin Refugees</b>	<p>A person who flees their home country due to political or economic hardship. In 1958, over 3 million east Germans had fled the border to West Germany. Many of them were skilled workers who wanted better pay and quality of life.</p>	



### Knowledge Organiser: End of the Cold War 1979-1991

<p>The Cold War crises of the 60s revealed just how tense relations became between the USA and the USSR. In the 70s, a policy of détente was being pursued. By the end of the decade however, relations had deteriorated again to the point where some described it as a 'Second Cold War'. By 1990 though, the Cold War was coming to an end.</p>		Chronology: What happened on these dates?		Vocabulary: Define these keywords:	
		1972	SALT I is signed.	Détente	A period of peace between two groups that had previously been at war or were hostile to each other.
1975	Helsinki Accords are signed.				
<p><b>Summarise your learning:</b></p>		1979	Soviet invasion of Afghanistan.	Ratification	Formal approval by the US government to make the law an official policy.
		1980	Carter Doctrine is announced.		
<p><b>Topic 1:</b> Détente</p> <p>There was a general move to improve relations and relax tensions which became known as détente. This involved attempts of arms limitations, summit talks and personal visits between the superpowers. For example, the Helsinki Accords were a basket of agreements covering Europe's borders, international cooperation and human rights. At first, it seemed there was good reason for optimism but this was short-lived.</p>	<p><b>Topic 2:</b> Afghanistan</p> <p>Détente was overshadowed by the Soviet Union's invasion of Afghanistan. President Carter issued his doctrine which signalled a deterioration in relations. Then, President Reagan wanted to re-establish the USA as the leading superpower. One of his policies was his 'Evil Empire' speech in 1982, where he was accused of fanning the flames of war.</p>	1983	President Reagan announced Star Wars strategy (SDI).	Economic sanctions	Measures taken to damage a country's economy usually involving a trade ban.
		1984	Due to poor relations following Afghanistan, and the US's boycott of the Moscow Olympics back in 1980, the Soviet Union boycotted the LA Olympics.		
<p><b>Topic 3:</b> Gorbachev and eastern Europe</p> <p>Gorbachev's 'new thinking' (glasnost and perestroika) had major effects on eastern Europe and the fall of the Berlin Wall set off a chain of events which brought about the collapse of Soviet control of eastern Europe. In the Soviet Union itself, Gorbachev's reforms encouraged criticism and eventually the downfall of Gorbachev himself. It also brought about the end of the USSR and the collapse of the Warsaw Pact.</p>		1989	Fall of the Berlin Wall.	Shah	The King or emperor of Iran.
		1991	Gorbachev is overthrown and the USSR collapsed.	Coup	A sudden seizure of power from the government.
		Richard Nixon	US President from 1969 to 1974.	NUTS	The idea that in a nuclear war, specific targets could be identified by limiting destruction. It led to the possibility of winning a nuclear war.
		Leonid Brezhnev	Leader of the Soviet Union from 1964-1982.		
		Jimmy Carter	US president from 1977-1981.		
		Ronald Reagan	US President from 1981-1989.		
		Mikhail Gorbachev	Leader of the Soviet Union from 1985-1991.		
				Carter Doctrine	US President Jimmy Carter's policy that the USA was prepared to use military force to protect its interests.
				Perestroika	Russian for 'reconstruction'. Used in the Gorbachev era to describe his programme for reorganising and restructuring the Soviet state.
				Deployment	Distribution of military forces within an area.