

Climate Change Knowledge Organiser

Key terms

Atmosphere - a layer of gases that surrounds the planet

Weather - the current conditions in the atmosphere

Climate - the average weather conditions in an area over a period of time

Greenhouse effect - the process by which CO² and other gases prevent the Earth's heat escaping into space

Greenhouse gas - a gas, present in the atmosphere, which reduces the loss of heat into space (carbon dioxide, methane, nitrous oxide, water vapour, CFCs).

Global warming - the slow increase in the earth's average temperature

Carbon emissions - CO₂ added to the atmosphere by burning fossil fuels

Enhanced Greenhouse effect - the effect of increased levels of CO² and other gases in the atmosphere to prevent more of the earth's heat from escaping into space

Causes of climate change

Human causes

Burning fossil fuels – fossil fuels like coal and natural gas contain high amounts of carbon; burning them for energy releases this carbon into the atmosphere

Transport emissions – most use petrol or diesel for fuel which releases greenhouse gases into the atmosphere.

Deforestation - trees absorb carbon and transform it into oxygen during photosynthesis; if they are cut down there will be more carbon in the atmosphere

Dumping waste in landfills - when waste is left to decompose in a landfill it produces and gives off methane, another greenhouse gas like carbon

Agriculture - agricultural practices lead to the release of nitrogen oxide & methane into the air



Natural causes

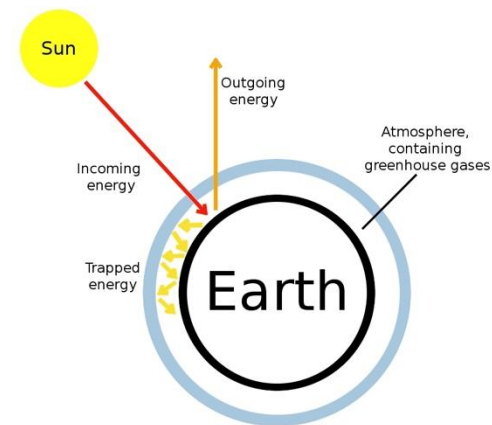
Orbital changes - the Earth has natural periods (like ice ages) where the average temperature changes a lot due to changes in the tilt, wobble and shape of the orbit.

Solar output - the amount of solar radiation from the sun changes; if it is stronger, Earth's temperatures will rise

Volcanic eruptions – during a volcanic eruption carbon dioxide is released.

What is the greenhouse effect?

Solar radiation (the sun's rays) power the climate system. Some solar radiation is reflected by the Earth and the **atmosphere**. About half the solar radiation is absorbed by the Earth's surface and warms it. Infrared radiation is emitted from the Earth's surface. Some of this infrared radiation passes through the atmosphere, but most is absorbed and re-emitted in all directions by clouds & **greenhouse gases**. The effect of this warms the earth's surface and lower atmosphere. Human activities can impact the amount of greenhouse gasses in the atmosphere, and can therefore increase global temperatures.



Impacts of climate change

Climate change affects the whole planet but looks different in different places or seasons. Below are some examples of positive **and** negative effects of climate change.

Positive	Negative
<ul style="list-style-type: none"> • Longer growing season for agriculture • Energy consumption may decrease due to warmer climate • Frozen regions like Northern Canada may be able to grow crops • As ice melts in the Arctic, faster shipping routes may open up, helping trade • Increase in fish stocks in some areas 	<ul style="list-style-type: none"> • Malaria and cholera increase due to temperature increase • Increase in climate change refugees as areas become unsuitable for human life • Sea level rise will affect ~80 million people • Coral reefs damaged as a result of increased ocean/ sea temperatures • Tropical storms will increase in magnitude (strength) • Species in affected areas (i.e. Arctic) may become extinct • Ski resorts may lose business as snow cover decreases

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Reducing emissions

Individuals can reduce their emissions by:

- Driving electric cars
- Using renewable energy sources e.g. solar panels
- Eating less meat
- Planting more trees
- Using public transport or walking/cycling
- Insulating houses
- Buying local produce.
- Reducing waste and recycling



Governments can reduce emissions by:

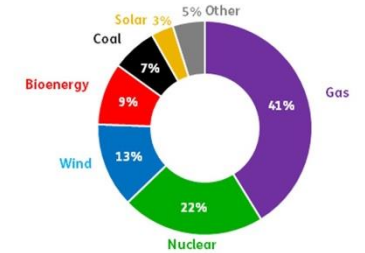
- International agreements such as the Kyoto Protocol or Paris agreement
- Investing in renewable technology such as wind energy
- Investing in public transport or cycling infrastructure e.g. cycle lanes

Renewable and non-renewable energy sources

We harvest energy from many different sources. These sources are either **renewable** (meaning they can be used over and over again without running out) or **non-renewable** (meaning they can only be used once and will eventually run out). Renewable energy sources are more sustainable because we never have to worry about future generations running out.

UK electricity generation

Proportion of total electricity generated from different sources in the 12 months ending September 2017



Renewable	Non-renewable
Wind power	Coal
Hydro-electric power	Natural gas
Wave & tidal energy	Oil
Solar power	Nuclear power
Geothermal energy	

Nuclear Power

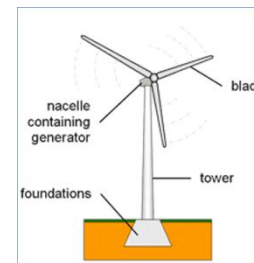
Nuclear power is created from the release of energy from nuclear reactions (**fission** or **fusion**). These reactions usually use uranium or plutonium.



Advantages	Disadvantages
<ul style="list-style-type: none"> - Does not release much carbon - Can provide cheap power to LICs - Only small amounts of fuel needed to produce lots of energy compared to fossil fuels 	<ul style="list-style-type: none"> - Non-renewable - Produces dangerous waste to be disposed of - Accidents and leaks can be deadly and last for a long time

Wind Power

Wind energy is produced when the blades of the turbine spin and thus turn the generator which produces electricity.



Advantages	Disadvantages
<ul style="list-style-type: none"> - Produce very little pollution - Renewable - Land beneath them can be used for other things e.g. farming 	<ul style="list-style-type: none"> - Wind is unreliable and may not always blow - They can injure birds flying past - Difficult to store excess energy

Hydro-Electric Power

Fast flowing water is used to turn the turbines, thus generating energy. Water is often stored behind a dam in deep valleys.



Advantages	Disadvantages
<ul style="list-style-type: none"> - Dams can manage flooding and water resources - Reservoirs can be used for water sports - Can be used for irrigating crops 	<ul style="list-style-type: none"> - Can damage wetland and aquatic ecosystems downstream - Expensive to build - Large areas of land must be flooded to create reservoirs