

Climate Change

WHAT IS CLIMATE?

- Climate is the average weather in a place. It tells us what the weather is usually like.
- Climate is worked out by taking weather measurements over a long period of time (usually 30 years) and then calculating the average i.e. of temperature and rainfall.
- Weather is what you get on a day-to-day basis

WHAT IS CLIMATE CHANGE?

A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels!

EVIDENCE FOR CLIMATE CHANGE

ANALYSIS OF POLLEN AND TREES

Allows us to see if more or less pollination has taken place. More pollen would suggest a warmer climate as there would be more pollen and less pollen would indicate the opposite.

WEATHER RECORDINGS

Thermometers are more accurate now and digital readings can be recorded remotely. This means you can easily tell if the climate has changed as you can compare different dates at different times

ICE CORES

Locked inside ice are molecules and trapped air, which are preserved year on year with more snowfall. Subtle changes in temperature can be measured from ice cores extracted in Antarctica. These can be used to tell the climate from millions of years ago.

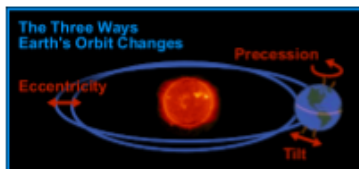
ROCKS AND FOSSILS

These can be studied for information covering longer time periods. Eg. limestone would have been formed on the bottom of a warm seabed millions of years ago. Telling us what climate was like when first created

NATURAL CAUSES OF CLIMATE CHANGE

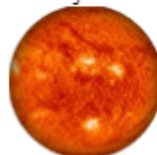
ORBITAL THEORY

- The Earth's orbit is sometimes circular, and sometimes more of an ellipse (oval)
- The Earth's axis tilts. Sometimes it is more upright, and sometimes more on its side.
- The Earth's axis wobbles, like a spinning top about to fall over.



SUNSPOT THEORY

- The Sun's output is not constant. Cycles have been detected that reduce or increase the amount of solar energy.
- Temperatures are greatest when there are plenty of sunspots - because it means other areas of the Sun are working even harder!



THE ERUPTION THEORY

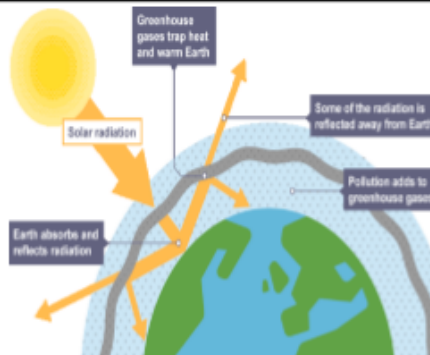
- Volcanic eruptions produce ash and sulphur dioxide gas. This is circulated globally by high level winds.
- The blanket of ash and gas will stop some sunlight reaching the Earth!
- Instead, the sunlight is reflected off the ash/gas, back into space.
- This cools the planet and lowers the average temperature.



HUMAN CAUSES OF CLIMATE CHANGE

THE GREENHOUSE EFFECT

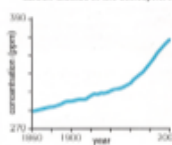
- A natural function of the Earth's atmosphere is to keep in some of the heat that is lost from the Earth.
- The atmosphere allows the heat from the Sun (short-wave radiation) to pass through to heat the Earth's surface.
- The Earth's surface then gives off heat (long-wave radiation).
- This heat is trapped by **greenhouse gases** (eg methane, carbon dioxide and nitrous oxide), which radiate the heat back towards Earth.
- This process heats up the Earth.



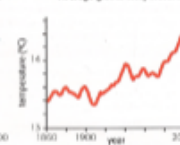
HUMAN FACTORS INCREASING WARMING

- Burning fossil fuels, eg coal, gas and oil - these release carbon dioxide into the atmosphere.
- Deforestation - trees absorb carbon dioxide during photosynthesis. If they are cut down, there will be higher amounts of carbon dioxide in the atmosphere.
- Dumping waste in landfill - when the waste decomposes it produces methane.
- Agriculture - agricultural practices lead to the release of nitrogen oxides into the atmosphere.

Carbon dioxide in the atmosphere



Average global temperature



- Carbon dioxide (CO₂) is a greenhouse gas
- As technology has developed and the population on earth has increased, the amount of CO₂ has increased since 1860.
- Data clearly shows that although temperatures have fluctuated since 1960, the general pattern is that global temperatures have increased as CO₂ levels rise