Monday 24th May 2022

Revision – Climate Change

Evidence for Climate Change

* Ice and Sediment Cores – By analysing cores of ice glaciers, we can see how the temperature has changed overtime. This shows us that the average global temperature has been increasing over the past 100 years.
* Temperature Records – Global temperatures have been recorded using thermometers since the 1850s. This gives us a reliable, short-term record of temperature change. We can also use historical sources, such as weather reports in newspapers, to look back further.
* Pollen Analysis – Pollen from plants is preserved in sediment which settles at the bottom of lakes and peat bogs. Preserved pollen from similar plants proves that conditions were the same as they are now.

Natural Causes of Climate Change

* Orbital Changes – There are variations in the Earth’s orbit around the sun. This means that the amount of sunlight that the Earth receives can vary:
  + Stretch – The Earth’s orbit around the sun is elliptical. This is also called eccentricity.
  + Axial Tilt – The tilt of the Earth’s axis varies between 22.1°-24.5° over time. This changes the amount of sunlight that different areas of the Earth receive.
  + Wobble – Also called precession, the Earth wobbles as it rotates.
* Volcanic Activity – Major volcanic eruptions eject material into the atmosphere. Some of these particles reflect some of the rays of the sun back into space, which cools the Earth. The Earth cooled by ~0.5° after the eruption of Mount Pinatubo in 1991.
* Solar Output – The energy output of the sun changes in cycles of 11 years. This means that the Earth’s climate may become cooler in some areas. However, this effect does not seem to have a major effect on climate change.

Human Causes of Climate Change

* The Greenhouse Effect – Greenhouse gases (such as carbon dioxide) absorb the heat leaving the atmosphere, keeping the planet warm. This is essential for life.
* Human Impact – However, humans are increasing the concentration of greenhouse gases, which is causing the effect to amplify:
  + Burning Fossil Fuels – CO2 (carbon dioxide) is released into the atmosphere when fossil fuels such as coal or oil are burnt.
  + Cement Production – Cement is made from limestone, which contains CO2. When cement is produced, large amounts of carbon dioxide are released into the atmosphere.
  + Farming – Livestock produce large amount of methane gas, as do rice paddies.
  + Deforestation – Plants remove CO2 from the atmosphere through photosynthesis. When plants are removed, that CO2 is no longer being taken in.

Effects of Climate Change

Environmental:

* Rising temperatures are causing glaciers and ice sheets to melt. This melting water means that sea levels will rise.
* Shrinking sea ice also causes a loss of polar habitats.
* Rising sea levels will cause more regular flooding in low-lying areas. Coastal erosion will increase, and habitats will be lost.
* Increasing ocean temperatures is causing a decline in some species, such as coral.
* Precipitation patterns are changing – climate change is affecting the rainfall in some areas.
* The distribution of species could change, and biodiversity could decrease.

Human:

* Deaths due to heat have increased
* Some low-lying areas are becoming uninhabitable
* Some areas are struggling to supply enough water due to changing precipitation patterns.
* Farming – Some crops are producing a lesser yield due to the increase of temperature. However, some crops in low latitude areas are producing more.
* Lower crop yields could increase malnutrition and deaths to starvation, especially in low-latitude areas.
* The weather is becoming more extreme due to climate change. As a result, more money is being spent on predicting, reducing the impact of, and repairing the damage caused by, extreme weather events.

Managing Climate Change

Reducing the Causes:

* Planting Trees – to increase the amount of CO2 absorbed from the atmosphere during photosynthesis.
* Carbon Capture – Carbon Capture and Storage (CCS) reduces the emissions from power stations that burn fossil fuels. CO2 is captured, and transported to a storage location, usually deep underground.
* Alternative Energy – Replacing fossil fuels with nuclear or renewable energy sources can help to reduce greenhouse emissions. In the UK, more offshore wind farms are being constructed, and there are plans for wave, tidal, and nuclear power plants.
* International Agreements (