

OCR B GCSE Chemistry

Topic 1: Air and water

What is the evidence for climate change, why is it occurring?

Notes



1. Describe the greenhouse effect in terms of the interaction of radiation with matter

- Greenhouse gases maintain temperatures on Earth high enough to support life
 - Include: water vapour, CO₂ & CH₄
- Explanation of the greenhouse gas effect:
 - Electromagnetic radiation at most wavelengths from the sun passes through the Earth's atmosphere
 - The Earth absorbs some radiation and thus warms up (essential for life on Earth). But some heat is radiated from the Earth as infrared radiation.
 - Some of this IR radiation is absorbed by greenhouse gases in the atmosphere
 - Atmosphere warms up leading to the greenhouse effect and global warming

2. Evaluate the evidence for additional anthropogenic causes of climate change, including the correlation between change in atmospheric carbon dioxide concentration and the consumption of fossil fuels, and describe the uncertainties in the evidence base

- Human activities increase levels of CO₂ & CH₄
- Examples include
 - Driving (CO₂)
 - Raising livestock (cows – CH₄)
- Based on peer-reviewed evidence, many scientists believe that human activities will cause the temperature of the Earth's atmosphere to increase at the surface and that this will result in global climate change
 - But, it is difficult to model such complex systems as global climate change.
 - This leads to simplified models, speculation and opinions presented in the media that may be based on only parts of the evidence and which may be biased.
- However, graphs can show a correlation between change in atmospheric carbon dioxide concentration (a greenhouse gas) and the consumption of fossil fuels



3. Describe the potential effects of increased levels of carbon dioxide and methane on the Earth's climate, including where crops can be grown, extreme weather patterns, melting of polar ice and flooding of low land

- An increase in average global temperature is a major cause of climate change, this is due to increased levels of greenhouse gases – such as CO₂ and CH₄
- There are several potential effects of global climate change
 - Extinction of species
 - Raising sea levels due to the melting of polar ice caps
 - Increased risk of skin cancer due to more dangerous UV rays hitting the surface of the Earth
 - Migration- people will move from areas suffering drought/flooding
 - Decrease in crop yield for all major world crops
 - extreme weather patterns

4. Describe how the effects of increased levels of carbon dioxide and methane may be mitigated, including consideration of scale, risk and environmental implications

- Must consider the scale of increased levels of CO₂ and CH₄, the risk they pose and environmental implications
- How to mitigate effects
 - Use cars less often
 - Or use different sources for fuel instead of crude oil – hydrogen (only emits water), biofuel (thought to be carbon-neutral)

5. Extract and interpret information from charts, graphs and tables

6. Use orders of magnitude to evaluate the significance of data

- Differing by 1 order of magnitude means, x is about ten times different in quantity than y
- If values differ by 2 orders of magnitude, they differ by about 100
- These are important to remember in terms of evaluating how significant of an effect something can have on the environment (e.g. amount of CH₄ in the atmosphere)

