

AQA GCSE Chemistry

Topic 9: Chemistry of the atmosphere

Carbon dioxide and methane as greenhouse gases

Notes

(Content in bold is for Higher Tier only)



Greenhouse gases

- Maintain temperatures on earth high enough to support life
- Include: water vapour, CO₂ & CH₄
- The greenhouse gas effect:
 - Electromagnetic radiation at most wavelengths (both long and short) 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

Human activities which contribute to an increase in greenhouse gases in the atmosphere

- Activities increase levels of CO₂ & CH₄
- Examples of human activity include:
 - Driving (CO₂)
 - Consuming electricity (CO₂)
 - Raising livestock (cows – CH₄)
 - Decay of organic waste in landfill sites (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.

Global climate change

- An increase in average global temperature is a major cause of climate change
- There are several potential effects of global climate change, including:
 - Extinction of species
 - Raising sea levels due to the melting of polar ice caps
 - Migration- people will move from areas suffering drought/flooding
 - Decrease in crop yield for all major world crops



The carbon footprint and its reduction

- Carbon footprint: the total amount of CO₂ and other greenhouse gases emitted over the full life cycle of a product, service or event.
- It can be reduced by reducing emissions of carbon dioxide and methane e.g. by using less electricity (so using less fossil fuels or using an alternative source of electricity), by reducing the amount of travel or transportation (of either goods or people) and by planting more trees.
- however, action may be limited because it's more difficult, can be more expensive and planting trees takes away land that could be used to grow crops.

