

WJEC (Eduqas) Chemistry GCSE

12 - The Earth and Its Atmosphere

Flashcards

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List three examples of gases found in the atmosphere.



List three examples of gases found in the atmosphere.

- Nitrogen
- Oxygen
- Carbon dioxide
- Noble gases



Suggest some common theories (with evidence) for how the Earth's atmosphere was formed.



Suggest some common theories (with evidence) for how the Earth's atmosphere was formed.

- Intense volcanic activity released gases into the early atmosphere
- Initially, the atmosphere consisted mainly CO_2 with little or no $\text{O}_2(\text{g})$
- Volcanoes produced nitrogen, which then gradually built up in the atmosphere
- There may be a small proportion of methane and NH_3
- Water vapour condensed to form oceans. CO_2 was dissolved in the water and carbonates were precipitated, producing sediments



Explain how an oxygen-rich atmosphere was developed over time.



Explain how an oxygen-rich atmosphere was developed over time.

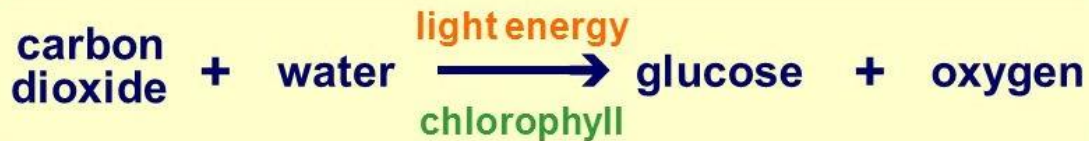
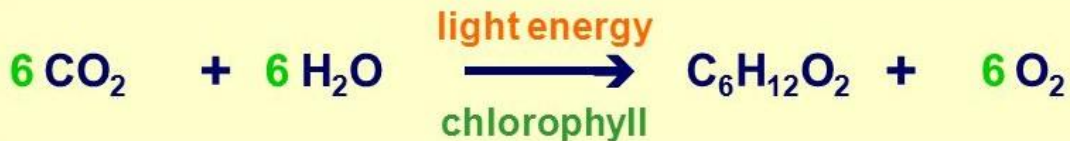
- Algae and plants released O_2 into the atmosphere as a result of photosynthesis:
 - Algae was the first oxygen-producing species. It started releasing O_2 into the atmosphere about 2.7 billion years ago
 - Plants then evolved and the percentage of O_2 gradually increased to a level that enabled animals to evolve



Give the equation for photosynthesis.



Give the equation for photosynthesis.



Explain how carbon dioxide in the atmosphere was reduced when the Earth's current atmosphere was being formed.



Explain how carbon dioxide in the atmosphere is reduced when the Earth's current atmosphere was being formed.

- Algae and plants decreased the percentage of CO_2 in the atmosphere by photosynthesis.
- CO_2 was also decreased by the formation of sedimentary rocks and fossil fuels that contain carbon.



State the percentage composition of nitrogen and oxygen in the atmosphere today.



State the percentage composition of nitrogen and oxygen in the atmosphere today.

- ~4/5 (80%) Nitrogen
- ~1/5 (20%) Oxygen



What are greenhouse gases?



What are greenhouse gases?

- Gases in the atmosphere which maintain temperatures on Earth high enough to support life.
- Greenhouse gases include water vapour, carbon dioxide and methane.



Explain the greenhouse gas effect.



Explain the greenhouse gas effect.

- Electromagnetic radiation from the sun passes through the Earth's atmosphere
- The Earth absorbs some radiation and thus warms up. 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



Define global warming.



Define global warming.

- An increase in the Earth's temperature due to the enhanced greenhouse effect which occurs when greenhouse gas concentrations are too high, causing the gases to trap too much heat.
- Global warming is an 'enhanced greenhouse effect'



List 3 examples of human activities which increase concentrations of greenhouse gases in the atmosphere.



List 3 examples of human activities which increase concentrations of greenhouse gases in the atmosphere.

- Driving (CO_2)
- Consuming electricity (CO_2)
- Raising livestock (cows – CH_4)
- Decay of organic waste in landfill sites (CH_4)



Define climate change.



Define climate change.

A change in global climate patterns largely believed to be caused by the increase in concentration of carbon dioxide in the atmosphere.



List 3 potential effects of global climate change.



List 3 potential effects of global climate change.

- Extinction of species
- Rising 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



What is a carbon footprint?



What is a carbon footprint?

- A carbon footprint is the total amount of carbon dioxide and other greenhouse gases emitted over the full life cycle of a product, service or event.



How can carbon footprints be reduced?



What can carbon footprints be reduced?

They can be reduced by reducing emissions of carbon dioxide and methane.

Humans can do this by becoming vegan. Livestock, especially cows, produce a lot of methane, thus if less livestock are reared, methane emissions will reduce. Another example would be cycling or walking rather than using transport that emits carbon dioxide.



How are carbon particulates and carbon monoxide produced?



How are carbon particulates and carbon monoxide produced?

- If there's not enough oxygen, some of the fuel doesn't burn – this is partial combustion. Here, solid particles of soot (carbons) and unburnt fuel are released.
- Carbon monoxide (CO) is also released when there isn't enough oxygen to produce carbon dioxide instead.



What are the consequences of carbon monoxide and particulates production?



What are the consequences of carbon monoxide and particulates production?

- Carbon monoxide causes health problems
- Soot/particulates cause global dimming



Explain how nitrogen monoxide and nitrogen dioxide are produced.



Explain how nitrogen monoxide and nitrogen dioxide are produced.

- Nitrogen and oxygen from the air combine to produce nitrogen monoxide
- When this nitrogen monoxide is released from vehicle exhaust systems, it combines with oxygen in the air to form nitrogen dioxide
- Nitrogen monoxide and nitrogen dioxide are pollutants



Explain the formation of sulfur dioxide.



Explain the formation of sulfur dioxide.

- Most fuels, including coal, contain carbon and/or hydrogen and may also contain some sulfur
- When the fuels are burnt in oxygen, this sulfur can react to form sulfur dioxide



What is acid rain?



What is acid rain?

- Rain that is acidic due to gases, such as sulfur dioxide, reacting with water vapour in the clouds.
- Sulfur dioxide is produced from the burning of fossil fuels which contain sulfur impurities.



Explain how acid rain is formed.



Explain how acid rain is formed.

Acid rain is formed when sulfur dioxide dissolves in rainwater.



List three negative effects of acid rain.



List three negative effects of acid rain.

- Damages buildings and statues (made of limestone)
- Stunt the growth of trees. May even kill trees and crops
- Lowers the pH of water in lakes and rivers, killing fish



What is potable water?



What is potable water?

Water that is safe for humans to drink.



What is groundwater?



What is groundwater?

Water which collects in rocks that then trap the water underground.



What is waste water?



What is waste water?

Water from industrial, domestic, agricultural and commercial activity. It requires treatment before it is potable.



What are the important properties of potable water?



What are the important properties of potable water?

- Low levels of microbes
- Low levels of contaminating substances
- It is not the same as pure water but is still safe



List three practical techniques to make ground and waste water potable.



List three practical techniques to make ground and waste water potable.

- Sedimentation
- Filtration
- Chlorination



Explain how sedimentation works.



Explain how sedimentation work.

- A process used in water treatment to remove solids from the water.
- Large insoluble particles will fall to the bottom of the container and form a sediment, allowing them to be easily removed.



Explain how filtration works.



Explain how filtration works.

- Water is filtered through beds of sand which removes small insoluble particles



Explain the process of chlorination.



Explain the process of chlorination.

A process used in water treatment where chlorine gas is injected into the water to kill any microbes.



List the steps used to make seawater potable using distillation.



List the steps used to make seawater potable using distillation.

- Filter the seawater
- Boil it
- Water vapour is cooled and condensed

