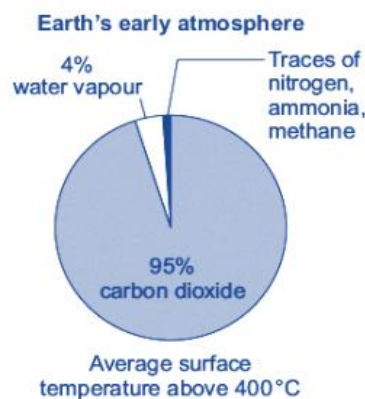


Keyword	Definition
Atmosphere	The thin layer of gases that surround some planets
Algae	An early organism capable of photosynthesizing
Photosynthesis	A reaction used by plants to produce glucose. Carbon Dioxide is absorbed, and Oxygen produced as a byproduct
Greenhouse gases	Gases in the atmosphere that absorb infra-red radiation
Carbon Footprint	The total amount of CO ₂ / greenhouse gases emitted in the life cycle of a product
Particulate	Particles of unburnt carbon that contribute to atmospheric smog, global dimming and effects on human health.
Combustion	Burning fossil fuels in the presence of oxygen.
Acid rain	Produced as a result of oxides of nitrogen and sulfur dissolving in rainwater.
Carbonate	Compound containing CO ₃ (a store of carbon in rocks)
Fossil fuel	Fuels containing carbon and hydrogen, e.g. coal, oil and gas.

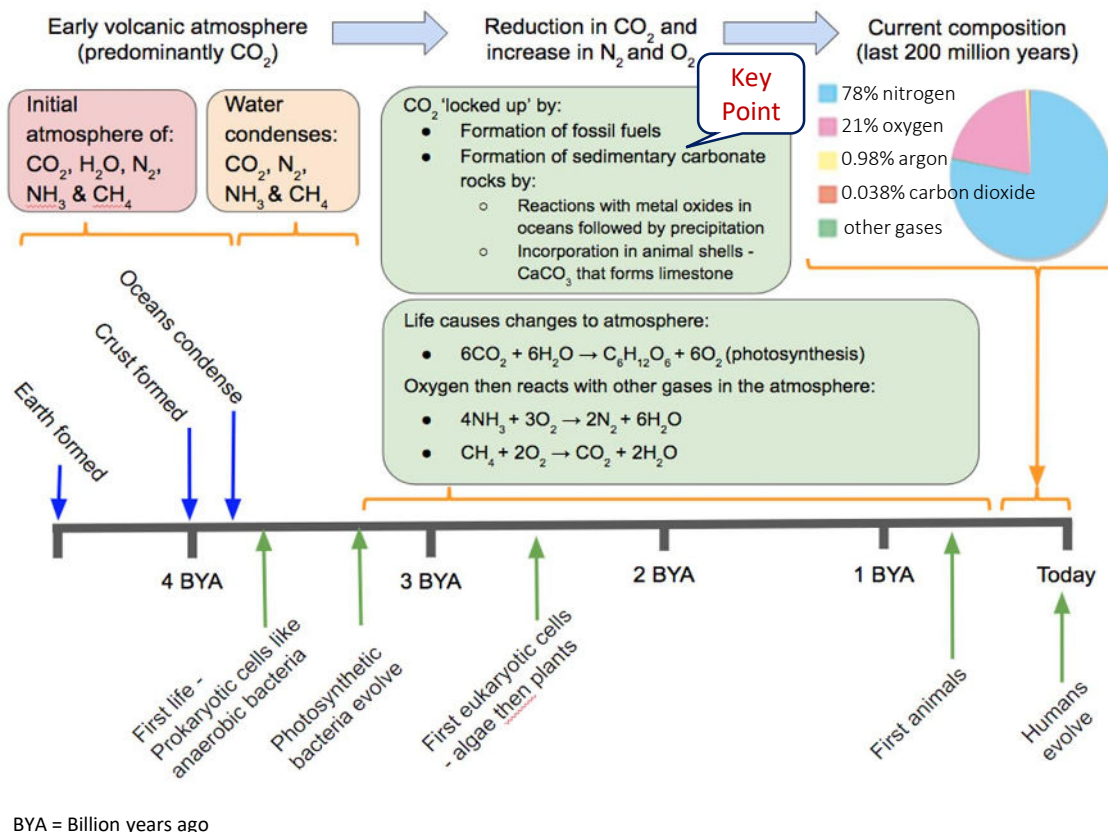
At 01 Earth's early atmosphere (4.6 Billion years ago)

- Theories about Earth's early atmosphere have changed over time.
- Evidence of the early atmosphere is limited due to changing over 4.6 billion years.
- A key theory suggests that volcanoes released gases such as: **nitrogen, carbon dioxide, water vapour and small amounts of methane and ammonia.**
- The current theory suggests the following percentages of gases in the early atmosphere:



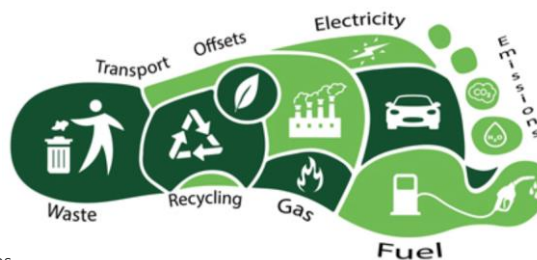
At 02 Our evolving atmosphere

- The Earth's atmosphere has evolved to what it is today and continues to change (in part, due to human activity).



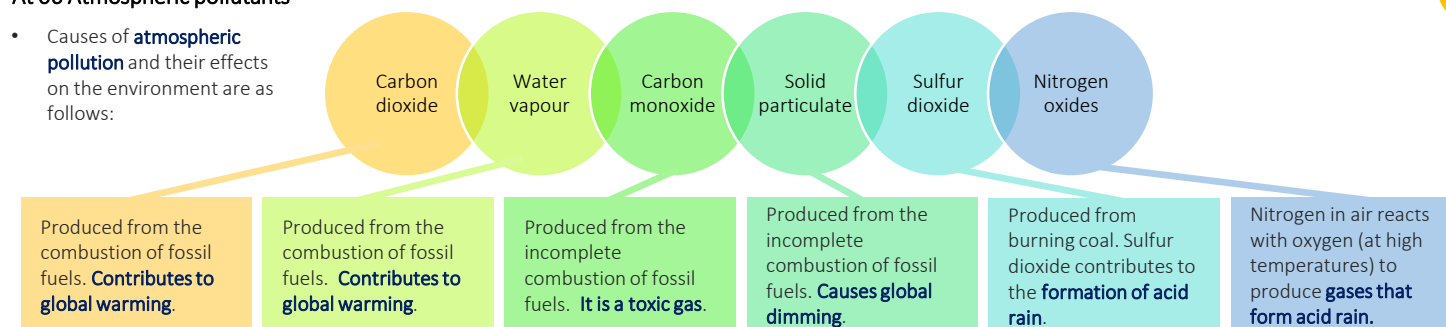
At 05 Carbon footprint

- The **carbon footprint** is the total amount of carbon dioxide and other greenhouse gases emitted over the full lifecycle of a product, service or event.
- Actions** to reduce the carbon footprint include:
 - Increased use of renewable energy sources
 - Energy conservation
 - Carbon capture and storage
 - Carbon taxes
 - Carbon offsetting through tree planting
- Problems** reducing the carbon footprint include:
 - Lack of public information and education
 - People making lifestyle changes
 - Economic problems in making the right changes
 - Incomplete co-operation between countries
 - Scientists cannot agree over the causes and consequences of global climate change.



At 06 Atmospheric pollutants

- Causes of **atmospheric pollution** and their effects on the environment are as follows:



X

At 02 evolving atmosphere

- Algae** and complex plants produced the oxygen that is now in the atmosphere by **photosynthesis** (see equation in green box).
- The increase in oxygen allowed animal life to evolve and spread all over the planet.
- The remains of **plankton** were deposited in the oceans, covered over and compressed over millions of years producing **fossil fuels** and **natural gas**.

Key Points

Required Practical:

None

Mathematical Skills:

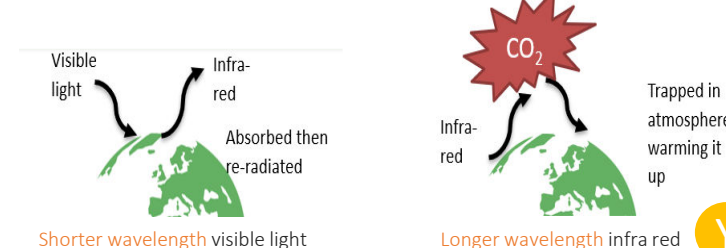
- You may be asked to use **ratio, fractions and percentages.**
- Be prepared to **evaluate data from graphs and tables.**

Key Points

At 03 Greenhouse gases

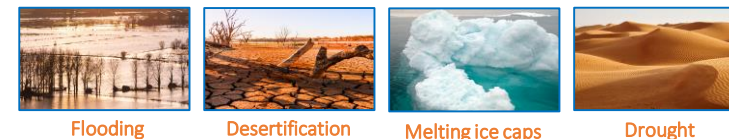
- Carbon dioxide locked-up in fossil fuels as carbon compounds can be **combusted** (burned) to re-release carbon dioxide into the atmosphere: A summary of the reaction is:

fossil fuel + oxygen → carbon dioxide + water
- Greenhouse gases in the atmosphere maintain temperatures on Earth by allowing **short wavelength radiation** to pass through the atmosphere to the Earth's surface but absorb the outgoing **long wavelength radiation** from the Earth causing an increase in temperature. Water vapour, carbon dioxide and methane are greenhouse gases.



At 04 Climate change

- Some human activities increase the amount of greenhouse gases in the atmosphere. These include:
 - carbon dioxide** from combustion and deforestation;
 - methane** from farming (digestion in pigs, sheep and cows) and decomposition of rubbish in landfill sites.
- The increase in the percentage of carbon dioxide in the atmosphere has increased over the last 100 years with an increase in burning fossil fuels.
- Many scientists believe that human activities will cause the temperature of the atmosphere to increase, resulting in **global climate change.**
- The potential effects of global climate change include:



Z

Relevant Modules:

- Organic Chemistry
- Waves

AQA

Useful YouTube links:

