


Chemistry Topic 9: Chemistry of the atmosphere

1. Composition of the earth's atmosphere now

79%	Nitrogen
20%	Oxygen
1%	Other gases including Argon, water vapour & CO ₂

2. Evolution of the atmosphere

Time	Atmosphere	reason
4 billion years ago	Nitrogen, Carbon dioxide and water vapour (like Mars)	Volcanic eruptions
	Nitrogen, Carbon dioxide decreases	Earth cools and water vapour condenses. Carbon dioxide dissolves into the oceans
2.7 billion years ago	Increasing oxygen decreasing carbon dioxide	Photosynthetic organisms evolved
	Reducing oxygen to modern levels	Animals evolved to breath oxygen and use it for respiration



3. Climate change

Greenhouse gases	Gases which increase the temperature of the atmosphere E.g. Carbon dioxide, methane, water vapour
Greenhouse effect	When excess greenhouse gases absorb and radiate IR radiation back to the earth warming it
Man-made climate change	The leading theory that human activities are causing an increase in global temperature
Carbon footprint	Total amount of carbon dioxide emitted over the life of a product, service or event
Global dimming	Particulates block the light from the sun slightly, reducing global temperature
Acid rain	Gases dissolve in rain causing damage to buildings, statues, lakes and trees

4. Atmospheric pollutants from combustion

Pollutant	Source	Effect
Carbon dioxide	All combustion	Global warming
Carbon monoxide	Incomplete combustion	Toxic, breathing problems
Carbon particle (Soot)	Incomplete combustion	Breathing problems, global dimming
Sulfur dioxide	Burning sulphur, impurities in fossil fuels	Acid rain
Oxides of nitrogen	Vehicle engines	Acid rain