

Gas	Percentage
Nitrogen	~80%
Oxygen	~20%
Argon	0.93%
Carbon dioxide	0.04%

Proportions of gases in the atmosphere

Algae and plants	<i>These produced the oxygen that is now in the atmosphere, through photosynthesis.</i>	carbon dioxide + water → glucose + oxygen $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
Oxygen in the atmosphere	<i>First produced by algae 2.7 billion years ago.</i>	Over the next billion years plants evolved to gradually produce more oxygen. This gradually increased to a level that enabled animals to evolve.

How oxygen increased

How carbon dioxide decreased

Reducing carbon dioxide in the atmosphere

Algae and plants

These gradually reduced the carbon dioxide levels in the atmosphere by absorbing it for photosynthesis.

Formation of sedimentary rocks and fossil fuels

These are made out of the remains of biological matter, formed over millions of years

Remains of biological matter falls to the bottom of oceans. Over millions of years layers of sediment settled on top of them and the huge pressures turned them into coal, oil, natural gas and sedimentary rocks. The sedimentary rocks contain carbon dioxide from the biological matter.

Composition and evolution of the atmosphere

AQA GCSE Chemistry of the atmosphere

Common atmospheric pollutants

CO₂ and methane as greenhouse gases

Greenhouse gases

Carbon dioxide, water vapour and methane

Examples of greenhouse gases that maintain temperatures on Earth in order to support life

The greenhouse effect

Radiation from the Sun enters the Earth's atmosphere and reflects off of the Earth. Some of this radiation is re-radiated back by the atmosphere to the Earth, warming up the global temperature.

Carbon footprints

The total amount of greenhouse gases emitted over the full life cycle of a product/event. This can be reduced by reducing emissions of carbon dioxide and methane.

Global climate change

Human activities and greenhouse gases

Effects of climate change

Rising sea levels

Extreme weather events such as severe storms

Change in amount and distribution of rainfall

Changes to distribution of wildlife species with some becoming extinct

Carbon dioxide

Human activities that increase carbon dioxide levels include burning fossil fuels and deforestation.

Methane

Human activities that increase methane levels include raising livestock (for food) and using landfills (the decay of organic matter released methane).

Climate change

There is evidence to suggest that human activities will cause the Earth's atmospheric temperature to increase and cause climate change.

Properties and effects of atmospheric pollutants

Carbon monoxide

Toxic, colourless and odourless gas. Not easily detected, can kill.

Sulfur dioxide and oxides of nitrogen

Cause respiratory problems in humans and acid rain which affects the environment.

Particulates

Cause global dimming and health problems in humans.

Atmospheric pollutants from fuels

Combustion of fuels

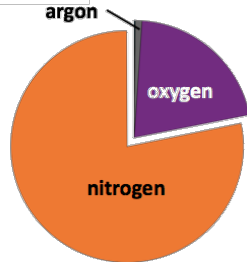
Source of atmospheric pollutants. Most fuels may also contain some sulfur.

Gases from burning fuels

Carbon dioxide, water vapour, carbon monoxide, sulfur dioxide and oxides of nitrogen.

Particulates

Solid particles and unburned hydrocarbons released when burning fuels.



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Human activities and greenhouse gases

	<i>Human activities that increase carbon dioxide levels include burning fossil fuels and deforestation.</i>
	<i>Human activities that increase methane levels include raising livestock (for food) and using landfills (the decay of organic matter released methane).</i>
	<i>There is evidence to suggest that human activities will cause the Earth's atmospheric temperature to increase and cause climate change.</i>

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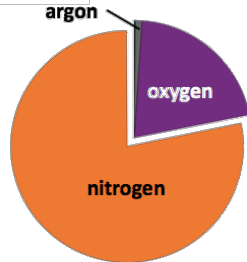
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Atmospheric pollutants from fuels

	<i>Source of atmospheric pollutants. Most fuels may also contain some sulfur.</i>
	<i>Carbon dioxide, water vapour, carbon monoxide, sulfur dioxide and oxides of nitrogen.</i>
	<i>Solid particles and unburned hydrocarbons released when burning fuels.</i>

	<i>Billions of years ago there was intense volcanic activity</i>	This released gases (mainly CO ₂) that formed to early atmosphere and water vapour that condensed to form the oceans.
	<i>Released from volcanic eruptions</i>	Nitrogen was also released, gradually building up in the atmosphere. Small proportions of ammonia and methane also produced.
	<i>When the oceans formed, carbon dioxide dissolved into it</i>	This formed carbonate precipitates, forming sediments. This reduced the levels of carbon dioxide in the atmosphere.

The Earth's early atmosphere



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Methane	
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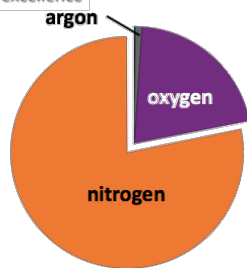
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The Earth's early atmosphere

Volcano activity 1 st Billion years		
Other gases		
Reducing carbon dioxide in the atmosphere		