Early and Current Atmosphere

During the first billion years of the Earth's existence there was intense volcanic activity that released gases that formed the early atmosphere and water vapour which condensed to form the oceans. Similar to the atmospheres of Mars and Venus today, consisting of mainly carbon dioxide with little or no oxygen gas.

Volcanoes also produced nitrogen which gradually built up in the atmosphere along small proportions of methane and ammonia. The carbon dioxide dissolved in the formed oceans and carbonates were precipitated producing sediments, reducing the amount of carbon dioxide

Present Atmosphere
~80% Nitrogen
~20% Oxygen
Trace amounts of CO2, Water Vapour and noble gases

Changes from the early atmosphere

Algae first produced oxygen about 2.7 billion years ago and soon after this oxygen appeared in the atmosphere. Over the next billion years plants evolved and the percentage of oxygen gradually increased to a level that enabled animals to evolve.

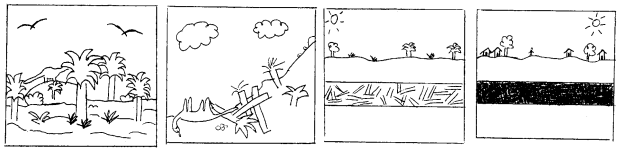
Photosynthesis

$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

carbon dioxide + water → glucose + oxygen

Algae also decreased the amount of Carbon dioxide in the atmosphere via photosynthesis, along with carbon dioxide forming sedimentary rocks and fossil fuels

Formation of Coal, Gas, Crude Oil



Coal is formed from trees in swamps millions of years ago. When these trees and animals die they get buried in mud. Layers form over them and the pressure and heat over time results in the formation of coal which is then mined. Oil and Natural gas are also formed in this process except they are formed by marine organisms in the sea.

Limestone is also produced from dead living organisms. The creatures themselves have decayed but their skeletons and shells undergo compaction form Limestone (Calcium Carbonate) $CaCO_3$

Global Warming

Scientists believe that greenhouse gases, such as Methane and Carbon Dioxide, are causing the planets temperature to increase, resulting in global climate change.

The burning of fossil fuels is one way in which we are increasing the amount of Carbon Dioxide in our atmosphere. The increase in the amount of cattle also results in more Methane which equally increases the temperature.

Global Warming can effect;
- Agriculture due to desertification
- Extreme weather conditions
- Increase in sea levels due to glaciers melting
- Changing of natural wildlife habitats

These will also have social effects on businesses who rely on the income generated from agriculture in the effected regions, furthermore homes will also be destroyed due to increased sea levels.

Atmospheric Pollutants

When fuels undergo combustion the gases released;
- Carbon Dioxide
- Carbon Monoxide
- Sulfur Dioxide
- Nitrogen Oxides
- Particulates

Fuels undergo either complete or incomplete combustion

fuel + oxygen → carbon dioxide + water

$C_mH_n + O_2 \rightarrow CO_2 + H_2O$

fuel + oxygen → carbon + water

$C_mH_n + O_2 \rightarrow C + H_2O$

(not enough)

carbon monoxide
CO

carbon dioxide
CO_2

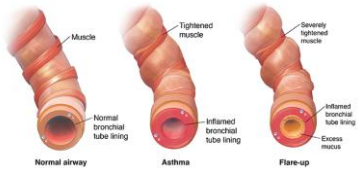
other carbon oxides
C_xO_y

Atmospheric Pollutants

Carbon Monoxide is a toxic gas (the silent killer) as it is colorless, odorless and not easily detectable.

Sulphur Dioxide and Nitrogen oxides cause acid by dissolving into water droplets in clouds, this makes the rain more acidic which can damage buildings and wildlife.

Particulates are unburnt carbon particles. These are absorbed into the clouds and cause more water droplets to form in clouds. Theyr also make clouds better at reflecting sunlight, which causes global dimming.



Sulfur dioxide, Nitrogen Oxides and particulates also cause respiratory health problems for humans