Greenhouse effect

Sunlight streams through the window of a greenhouse and the warmth it brings remains trapped inside the glass of the greenhouse. There is a similar ‘greenhouse effect’ on the Earth but, instead of glass, a layer of gases in the atmosphere traps the heat. These greenhouse gases keep the Earth warm enough for life to flourish on the planet.

However, factories, power stations and transport systems emit additional greenhouse gases. Now, too much heat is being trapped in the atmosphere ... and the world is getting warmer.

Solar energy
Energy from the Sun passes through the atmosphere to the Earth. Land and water absorb some and reflect the remainder back into the atmosphere (yellow arrows). However, most of the energy remains trapped (red arrows) by the extra greenhouse gases added to the atmosphere by human activity.

The Antarctic ozone hole
The purple area shows the thinning of the ozone layer in the stratosphere above Antarctica. Ozone absorbs ultraviolet light, so any thinning allows more ultraviolet light to reach the Earth.

GREENHOUSE GASES
Carbon dioxide (from burning fossil fuels) and methane (from natural gas, large rubbish dumps and livestock gas) make up 70 per cent of the extra greenhouse gases released by human activities. Carbon dioxide can remain in the atmosphere for up to 200 years. The atmospheric lifetime of methane is only 12 years.

Greenhouse gases (percentage of total)
- Nitrous oxide (N₂O) 9%
- Methane (CH₄) 17%
- Carbon dioxide (CO₂) 53%
- Fluorocarbons 12%
- Halocarbons (CFCs) 11%

Refracted: Solar rays from the Sun reach the Earth.
Reflected: Some solar rays are reflected back to space from the atmosphere.
Trapped: Energy and heat is trapped by the greenhouse gas layer and reflected back to the Earth.
Emitted: The heated land and sea release heat back into the atmosphere.

That’s Amazing!
It is 115 years since the Swedish physicist Svante Arrhenius first warned the world that the burning of fossil fuels would eventually cause global warming.