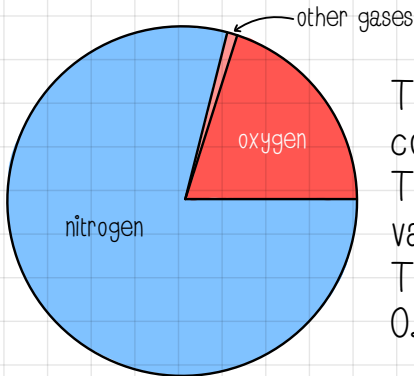


The greenhouse effect

Greenhouse gases

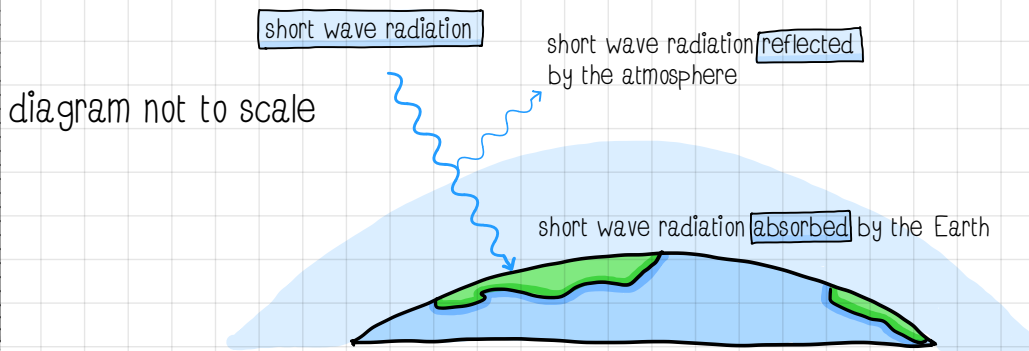


The 1% of different gases present in the atmosphere contains water vapour, carbon dioxide and methane. The amount of water vapour in the atmosphere is variable and changes depend on the temperature. The amount of carbon dioxide is equal to about 0.04% and there are also tiny amounts of methane.



Water vapour, carbon dioxide and methane are all greenhouse gases.

The greenhouse effect



Energy from the Sun travels to the Earth as **short wavelength** radiation (e.g. ultraviolet and natural light). A small amount of the short wave radiation is **reflected** back into space by the atmosphere. Most of radiation passes through the atmosphere.



Short wavelength radiation is not readily absorbed by the gas molecules in the atmosphere so it passes through to the Earth.



The energy from the radiation is transferred when it is **absorbed** by the Earth.



As a result the energy absorbed by the Earth causes it to warm up. As the Earth warms up it **radiates** energy. You may have seen this on a hot summers day when tarmac roads radiate the energy they have absorbed from the Sun.

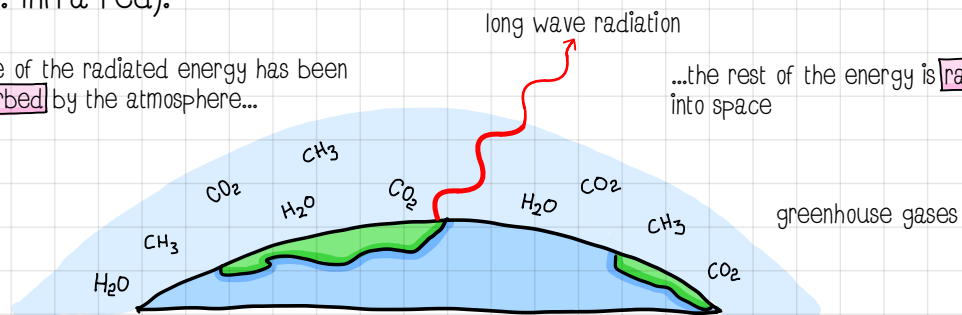
The greenhouse effect...



The surface of the Earth radiates the energy as **long wavelength** radiation (e.g. infra-red).

Some of the radiated energy has been **absorbed** by the atmosphere...

...the rest of the energy is **radiated** into space



Some of the long wave radiation is **absorbed** by the **greenhouse gas** molecules in the atmosphere (e.g. water vapour, carbon dioxide and methane).



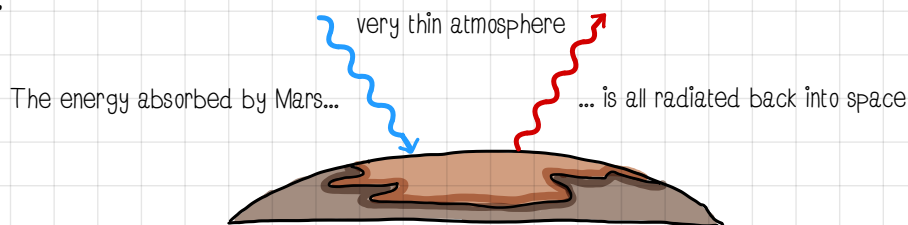
Because the energy has been transferred to the atmosphere, the **temperature** of the atmosphere will **increase**.



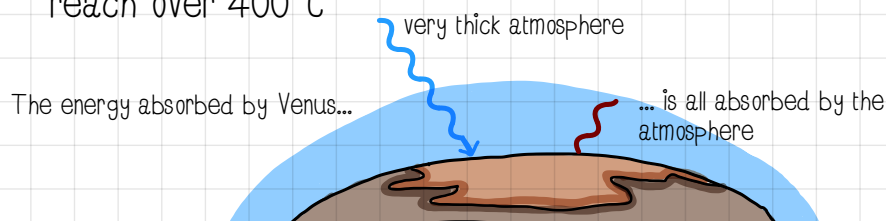
The greenhouse effect is very important as it keeps the Earth warm enough to support life. If there was no greenhouse effect the Earth would be too cold for living organisms to survive.

The greenhouse effect on other planets

Mars has almost no greenhouse effect. Although it has carbon dioxide in its atmosphere, the atmosphere is so thin (about 1% of the Earth atmosphere). Mars is unable to trap any of the energy absorbed by the Sun.



Venus has a very dense atmosphere of carbon dioxide (about double the atmosphere of the Earth). Venus traps all the energy absorbed by the Sun. As a result the temperatures on Venus reach over 400°C



 watch video