

# The Greenhouse effect

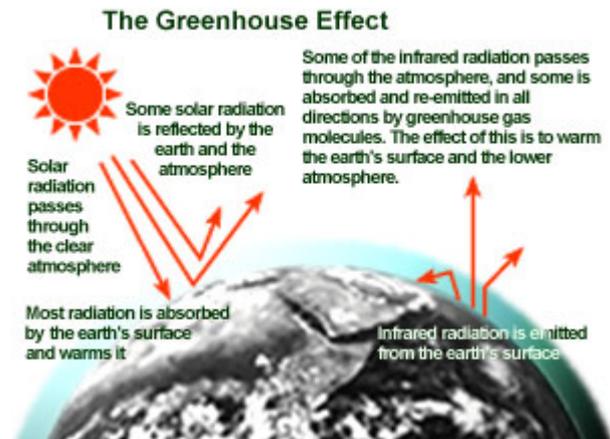
## Greenhouse effect

Energy from the sun is absorbed by our atmosphere and the Earth's surface. It powers the earth's weather and climate systems (winds, waves and rainfall), and warms the earth's surface.

The earth radiates some of that energy back into space, but some of the energy is retained by the things that have absorbed it - making them 'hotter'.

Atmospheric greenhouse gases, such as water vapour, carbon dioxide and methane (natural gas) are particularly good at 'trapping' some of the outgoing energy, retaining heat somewhat like the glass panels of a greenhouse.

Without this natural "greenhouse effect," temperatures would be much lower than they are now as the Earth would radiate much more of the heat energy it got from the Sun straight back out into space! Life as we know it would not be possible. Instead, thanks to greenhouse gases, the earth's average temperature is a more hospitable average 16°C.



However, problems may arise when the atmospheric concentration of greenhouse gases increases and we are doing that by releasing extra carbon dioxide into the atmosphere - this form of pollution of our atmosphere causes **Global Warming**. We add extra carbon dioxide into our atmosphere when we **burn fossil fuels (coal, oil and natural gas)**. The carbon they contain has been locked out of the carbon cycle for millions of years - and we have put tons of it back in a few hundred years.

**What will happen?** It is expected that the average global surface temperature could rise 0.6-2.5°C in the next fifty years, and 1.4-5.8°C in the next century, with significant regional variation. That doesn't sound much but it is quite significant. The average global temperature during the last ice age was only 5°C lower than today!

- **Evaporation will increase** as the climate warms (adding to the problem because water vapour is a greenhouse gas), which will increase average global rainfall.
- **Soil moisture is likely to decline** in many regions leading to crop failures and famines, and intense rainstorms are likely to become more frequent - leading to storm damage of buildings and crops.
- **Sea level is also likely to rise** and low lying regions will flood. This will be because the oceans will expand (as they are at a higher temperature) and also some of the ice at the poles will melt.

As the climate changes, most species of plants and animals will not be able to survive in their current geographic locations. They will need to move to more suitable areas. However, whereas they had 10,000 years to adapt to a warming climate after the last ice age, they will have only 100 years if humans increase the temperature a similar amount in the next century - around 5 degrees - and that means many of them will become extinct.

Scientists believe that global warming will not only bring higher temperatures, but also extreme weather variation. For example, what was once a 100-year flood might become commonplace and natural disasters such as hurricanes, tornadoes, blizzards, floods, and droughts will occur more frequently.

Fix this sheet in your note books and answer the following questions in neat:

- Q1. Where does our planet get its energy from?
- Q2. What two things can happen to the energy that enters the atmosphere?
- Q3. What name is given to the gases that 'trap' some of the Sun's energy within our atmosphere?
- Q4. Name three 'greenhouse gases'.
- Q5. If our atmosphere had less greenhouse gases in it what difference would there be in our night time temperatures? ...and how would this affect our average temperature?
- Q6. What name do we give to the increased greenhouse effect?
- Q7. How are we causing Global Warming happen?
- Q8. List three possible consequences of global warming.