

The greenhouse effect

A garden greenhouse keeps plants warmer than they would be outside, even though it often does not have an extra source of heat. Greenhouses work because the glass traps some of the sun's radiation energy. The atmosphere keeps the Earth warm in a similar way. Without any greenhouse effect the average temperature of the Earth would be about -18°C , similar to a domestic freezer. Instead it averages around 15°C . Many, although not all, gases in the atmosphere act as so-called 'greenhouse gases' and help to warm our planet. These include: carbon dioxide; water vapour; methane; chlorofluorocarbons (CFCs) and their replacements, hydrochlorofluorocarbons (HCFCs) and oxides of nitrogen.

The diagram below shows the greenhouse effect. Add the labels to the diagram.

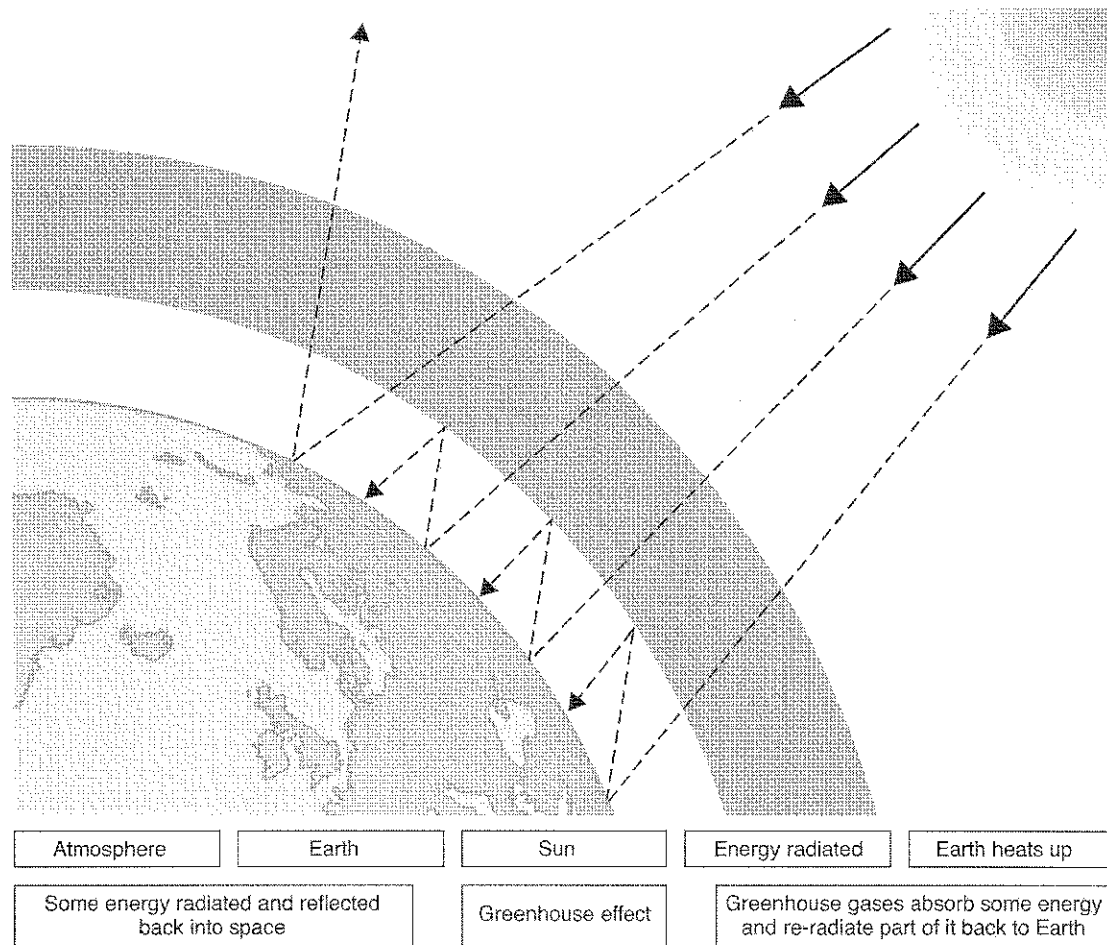


Diagram adapted from *Climate Change*, Dorothy Warren, Royal Society of Chemistry 2001.

Questions

1. If the greenhouse effect did not exist would the normal temperature of the Earth be higher or lower? By how much?
2. Why might an increase in the concentration of greenhouse gases be a concern? What might be the effect of an increase? Use the diagram to help you answer.

3. Look at the list of greenhouse gases in the table below. List some sources of each gas.

Greenhouse gas	Possible sources
Carbon dioxide	
Water vapour	
Methane	
Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs)	
Oxides of nitrogen (NO _x)	