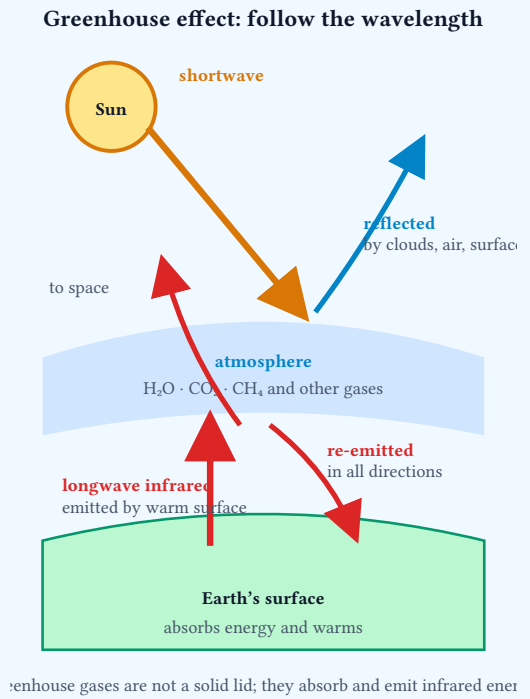
Science 10

Unit D: Energy flow in global systems

Earth systems and the greenhouse effect

Earth’s temperature and the atmosphere

- Earth’s surface absorbs solar radiation and emits infrared radiation.
- Greenhouse gases absorb and re-emit some outgoing in-frared radiation, changing the rate of energy loss to space.



enhouse gases are not a solid lid; they absorb and emit infrared ener

Effects of greenhouse gases

- Greenhouse gases matter because they absorb and emit infrared radiation.
- That changes how fast energy leaves, and therefore the temperature at which incoming and outgoing energy balance.
- On a diagram, label the reservoirs and the arrow directions. Say the energy is slowed on its way out to space.

Key terms

atmosphere

The layer of gases surrounding Earth.

hydrosphere

All water on, under, and above Earth's surface.

biosphere

All living organisms and the regions they inhabit.

greenhouse gas

A gas that absorbs and emits infrared radiation.

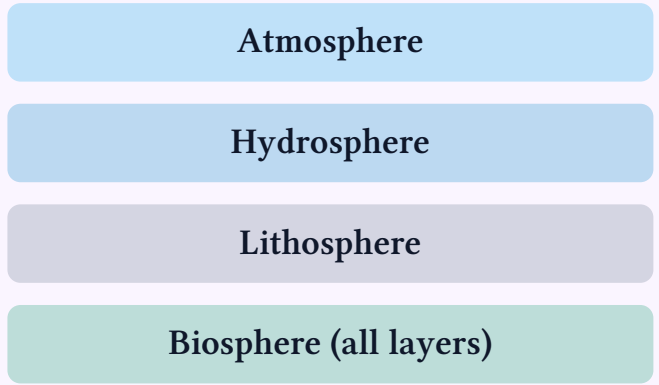
Key terms

greenhouse effect

Atmospheric warming caused by absorption and re-emission of infrared radiation.

Earth spheres

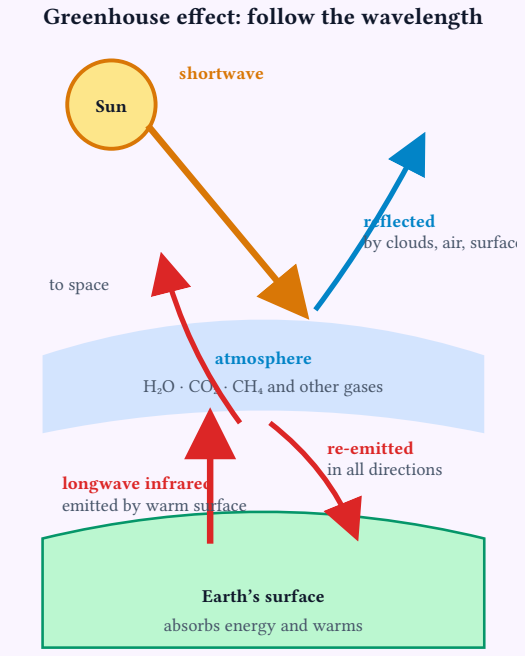
- Air, water, rock, and life trade materials.
- Water leaves a lake as vapour. Rock weathers into soil. Plants take in carbon.
- Draw the reservoirs and the arrows, and say which boundary you are using.
- A missing arrow is a missing transfer, and that matters.



reenhouse gases (H_2O, CO_2, CH_4) trap outgoing longwave radiatic

Greenhouse effect

- The surface absorbs sunlight and gives off infrared radiation.
- Carbon dioxide, methane, and water vapour absorb some of that infrared and emit it again.
- The planet warms until energy leaving matches energy absorbed.
- The effect is wavelength-specific. Calling it a blanket around Earth is only a rough comparison.



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An exchange between spheres

- Trace one matter transfer and one energy transfer through at least two Earth systems.
- A complete answer names the reservoirs, points the arrows the right way, and says the energy is slowed on its way out.