



# Scientific explanation

## Greenhouse temperatures



The temperatures on the thermometer in the plastic bag go much higher than those on the other thermometer. The sun's rays penetrate inside the bag and heat up the air trapped inside. Because the air cannot escape from the bag, the natural circulation of the air is confined to a very small space.

The farmer makes practical use of this phenomenon in his greenhouses. Short-wave solar radiation can penetrate through the glass into the interior and heat up the air, because glass is transparent to visible light. The ground absorbs some of the solar radiation and releases the remainder as heat. However, this long-wave radiation is reflected back by the glass, which again causes the air in the greenhouse to heat up.

The Earth is also heated by a greenhouse gas layer. The gases in the atmosphere act exactly like the glass in the farmer's greenhouses. They are transparent to short wavelength light, but reflect long-wavelength light.

Greenhouse gases like carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) have reinforced this effect in recent years, which has led to what is known as the "greenhouse effect".

**HINT:** Be sure to use identical thermometers, as the colour of the thermometer can influence the heating process.