



Greenhouse Effect

The warming of Earth's surface and lower atmosphere tends to intensify with an increase in atmospheric carbon dioxide. The atmosphere allows a large percentage of the visible light rays from the Sun to reach Earth's surface. Some of this energy is reradiated by Earth's surface in the form of long-wave infrared radiation. Much of this infrared radiation warms the atmosphere when it is absorbed by molecules of carbon dioxide and water vapor. A similar warming effect is produced by the glass of a greenhouse, which allows sunlight in the visible range to enter, but prevents infrared radiation from leaving the greenhouse.

The absorption of infrared radiation causes Earth's surface and the lowest layer of Earth's atmosphere to warm to a higher temperature than would otherwise be the case. Without this "greenhouse" warming, Earth's average surface temperature could be as low as -73°C . The oceans would freeze under such conditions.

Many scientists believe that modern industrialization and the burning of fossil fuels (coal, oil, and natural gas) have increased the amount of atmospheric carbon dioxide. This increase may result in an intensified greenhouse effect on Earth causing significant alterations in climate patterns in the future. Scientists estimate that average global temperatures could increase by as much as 5°C by the middle of the 21st century.

- 1 The lowest layer of Earth's atmosphere has undergone a large increase in temperature due to the presence of greenhouse gases. State the name of this temperature-zone layer.
- 2 State a possible wavelength, in centimeters, of infrared radiation.
- 3 Explain why most scientists believe an increase in the greenhouse effect will cause sea levels to rise.
- 4 State one possible change humans could make to significantly reduce the amount of greenhouse gases added to the atmosphere each year.