

Module 63

IV. Changes in CO₂ and global temperature are linked.

- ✓ One way to determine if human activities are **causing global warming** is to look at gas concentrations and temperatures from the past and compare them to gas concentrations and temperatures in the present day.
- ✓ The **IPCC** concluded that CO₂ is an important greenhouse gas that can contribute to global warming.
- ✓ As more nations industrialize and more fossil fuels are burned, carbon dioxide levels are **increasing**.
- ✓ Data from around the globe shows **that temperatures have increased** by 0.8 degrees Celsius from 1880-2009.
- ✓ You can **indirectly measure climate change** by looking at organisms that have been preserved for millions of years and chemically analyzing ice from long ago.
- ✓ **Computer models** are helping us predict future CO₂ changes.

V. Feedbacks can increase or decrease the impact of climate change

Positive feedbacks amplify change while negative feedbacks restrict change.

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VI. Global warming has serious consequences for the environment and organisms

- ✓ **Warmer temperatures** are causing the melting of polar ice caps, glaciers, and permafrost, resulting in rising sea levels.
- ✓ **Predicted effects** for the future are increased frequency of heat waves, reduced cold spells, altered precipitation patterns and storm intensity, and shifting ocean currents.
- ✓ The warming planet is also having an **effect** on living organisms.

VII. The Kyoto Protocol addresses climate change at the international level

- ✓ In 1997, representatives of the **nations of the world** convened in Kyoto, Japan to discuss how best to control the emissions contributing to global warming.

1. An international agreement to reduce global emissions of greenhouse gases is known as the _____.
2. Carbon sequestration is the approach of taking _____ out of the atmosphere.

Chapter Review

This chapter looks at the causes-both natural and human-and consequences of climate change. It also explains the greenhouse effect and the history of climate change. The chapter ends with the summary from the IPCC in 2007 (Table 19.2, page 540) that reviews methods countries are looking at to reverse the trend. It is very important to know what causes climate change, the chemicals involved in the process, and the environmental effects of a warmer climate.

Short Answer

1. Summarize and diagram the greenhouse effect.

2. List the five greenhouse gases and their relative impact on the greenhouse effect. Include their global warming potential and how long they remain in the atmosphere.

Greenhouse Gas	Impact	Warming Potential	Persistence

3. Why do carbon dioxide levels change seasonally?

4. How have scientists used ice cores to determine past climate patterns? How can these patterns help scientists make predictions about future climate change?

5. What are the two explanations for warming temperatures on Earth?

6. Explain carbon sequestration.

Do The Math

1. In 2010, the concentration of carbon dioxide in the atmosphere was 390ppm. If the annual rate of carbon dioxide increase is 1.4 ppm, what concentration of carbon dioxide do you predict for the year 2050?
2. If the annual rate of carbon dioxide increases from 1.4ppm to 1.9ppm, what will the concentration of carbon dioxide be in the year 2050?