

Chapter 13 Section 3 Notes

The Greenhouse Effect – process by which the atmosphere reradiated infrared radiation back to Earth's surface, keeping it warm

- what you get when heat is trapped by the atmosphere near Earth's surface
- water vapor is most responsible for the greenhouse effect

Measuring Carbon Dioxide in the Atmosphere

- 1958 – geochemist Charles David Keeling installed an instrument at the top of a tall tower on Mauna Loa observatory in Hawaii
 - he wanted to measure the CO₂ in the air far away from cities or forests
 - continuous records of atmospheric CO₂ have been recorded since 1958
 - they reveal a steady increase of atmospheric CO₂ since 1958
- phytoplankton, tropical rain forests, and oceans all reduce the CO₂ in the atmosphere

Rising Carbon Dioxide Levels

- some of the warming that has been observed over the 20th century can be attributed to human activity – specifically the burning of fossil fuels
- CO₂ levels have increased by over 20 percent in the last 50 years
- by analyzing ice cores from ice sheets, scientists can determine the levels of atmospheric CO₂ from thousands of years ago
 - These measurements show that CO₂ levels in the atmosphere today are higher than they have been for the last 20 million years

Greenhouse Gases and Earth's Temperature

- Major greenhouse gases are: water vapor, carbon dioxide, and methane
- carbon dioxide – a greenhouse gas released from burning fossil fuels
 - atmospheric CO₂ increases when fossil fuels are burned
- global warming – an increase in Earth's average temperature, resulting from increased greenhouse gases in the atmosphere

Modeling Climate Change

Predictions about future climate changes are based on computer models (a complex set of equations that account for many factors and require a great number of computations to solve)

The Consequences of a Warmer Earth

- increased frequency of major droughts
- increased frequency of major storms
- rising sea level
- warming surface waters of the ocean might cause a reduction in zooplankton (tiny, shrimp-like animals that many other marine animals depend on for food)

Recent Findings

- The average global temperature has risen some years and fallen other years but has increased overall during the 20th century.

Reducing the Risk

- Kyoto Protocol – international treaty that required that most developed countries decrease emissions of carbon dioxide and other greenhouse gases by 2012.
- Slowing climate change is difficult because of economic, political, and social factors