6-4 Meeting Ecological Challenges
Ozone Depletion

• 20 to 50 km above the Earth’s surface is a layer of ozone (O$_3$) gas called the **ozone layer**

• The ozone layer absorbs harmful UV radiation (the Earth’s sunscreen)
Human Activities Significantly Alter the Abiotic Environment

- **Stratosphere** (contains ozone layer)
- **Ozone layer** \((O_3)\)
- **Troposphere** contains most of atmospheric gases
- Concorde
- Mount Everest
Ozone Depletion

• Chlorofluorocarbons (CFC) have been linked to the breakdown of the ozone layer

• The use of CFC’s was banned in the U.S. in 1987
Environmental news isn’t all bad: with the sharp reduction of trifluocarbons (ozone depleting chemicals), ozone levels are returning to normal.
Greenhouse Effect

• Greenhouse Gases
  – Include carbon dioxide, methane, nitrous oxide, and water vapor
  – Serve as a “blanket” for stable planetary temperatures
  – Mars freezes overnight; Venus stays too hot; Earth…just right
Greenhouse Effect

• Normally green house gases hold in some of the sun’s heat, which keeps Earth warm enough for water to be present in all three phases, which allows life to exist
Natural Global Warming

Historical global warming and cooling is a fact. Cool periods show evidence of low levels of atmospheric CO$_2$, while warm periods show evidence of higher levels of atmospheric CO$_2$. 
Global Climate Change

• Human activities have increased the amount of green house gases (mainly CO$_2$), which has intensified the green house effect

• Increase in the average temperature in the biosphere is called global warming
Global Climate Change

• Evidence that global warming is occurring: average increase of 1 degree Celsius, melting polar ice and glaciers, rising sea levels
Glaciers are Receding Worldwide

The Andean Qori Kalis Glacier in 1978 (left) and 2000 (right).
Global Climate Change

- Possible effects of global warming: sea levels may rise enough to flood some coastal areas, ecosystem disruption (more endangered and invasive species), droughts in North America
Ecological Effects

• Caterpillar eggs usually hatch a few days before baby bird eggs hatch. This ensures plenty of food for baby birds.

• Caterpillar eggs are laid earlier now because of earlier warm temperatures causing earlier migration back to the states. What happens to baby birds if the caterpillars are in chrysalis form when the baby birds are born?