The Environment

- Changes Affecting You

Acid Rain

- Comes from burning of fossil fuels
- Fossil Fuels release sulfur
- Sulfur combines with water vapor forming sulfuric acid
- Rain, snow, sleet, hail bring sulfuric acid back to earth's surface where the damage is seen
- Most severe acid rain is in the United States with pH of 4.0-4.5 (7 is neutral)
- Acid rain damages plants, lakes, streams, soil chemistry, buildings, etc.

www.waterencyclopedia.com/A-Bi/Acid-Rain.html

serendip.brynmawr.edu/.../scienceeducation6.html

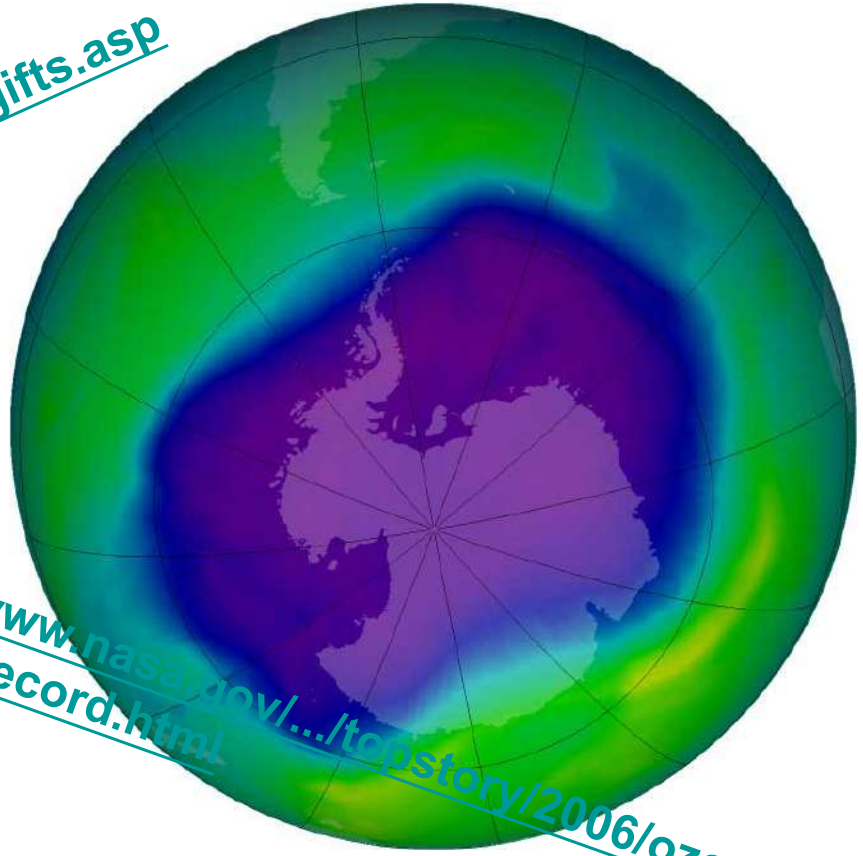
www.merritton.ca/effects.htm

Ozone Layer

- **The Ozone Hole**
  - Ozone shields the earth from harmful UV radiation
  - Hole in ozone over Antarctica is quite large (first discovered in 1978)
  - Smaller hole in ozone was found over the Arctic Circle
  - Predict more incidence of skin cancer, cataracts, retinal cancers
  - Since 1980, the number of malignant melanoma has doubled

"I'VE BEEN KEEPING MY THERMOSTAT DOWN TO 14."

www.cartoonstock.com/directory/h/heats_gifts.asp



www.nasa.gov/.../topstory/2006/ozone_record.html

What is Destroying Ozone?

- Main source of ozone destruction is from CFC (chlorofluorocarbons)
  - Coolants in refrigerators and air conditioners
  - Aerosol propellants in spray cans
  - Foaming agents in the production of foam cups

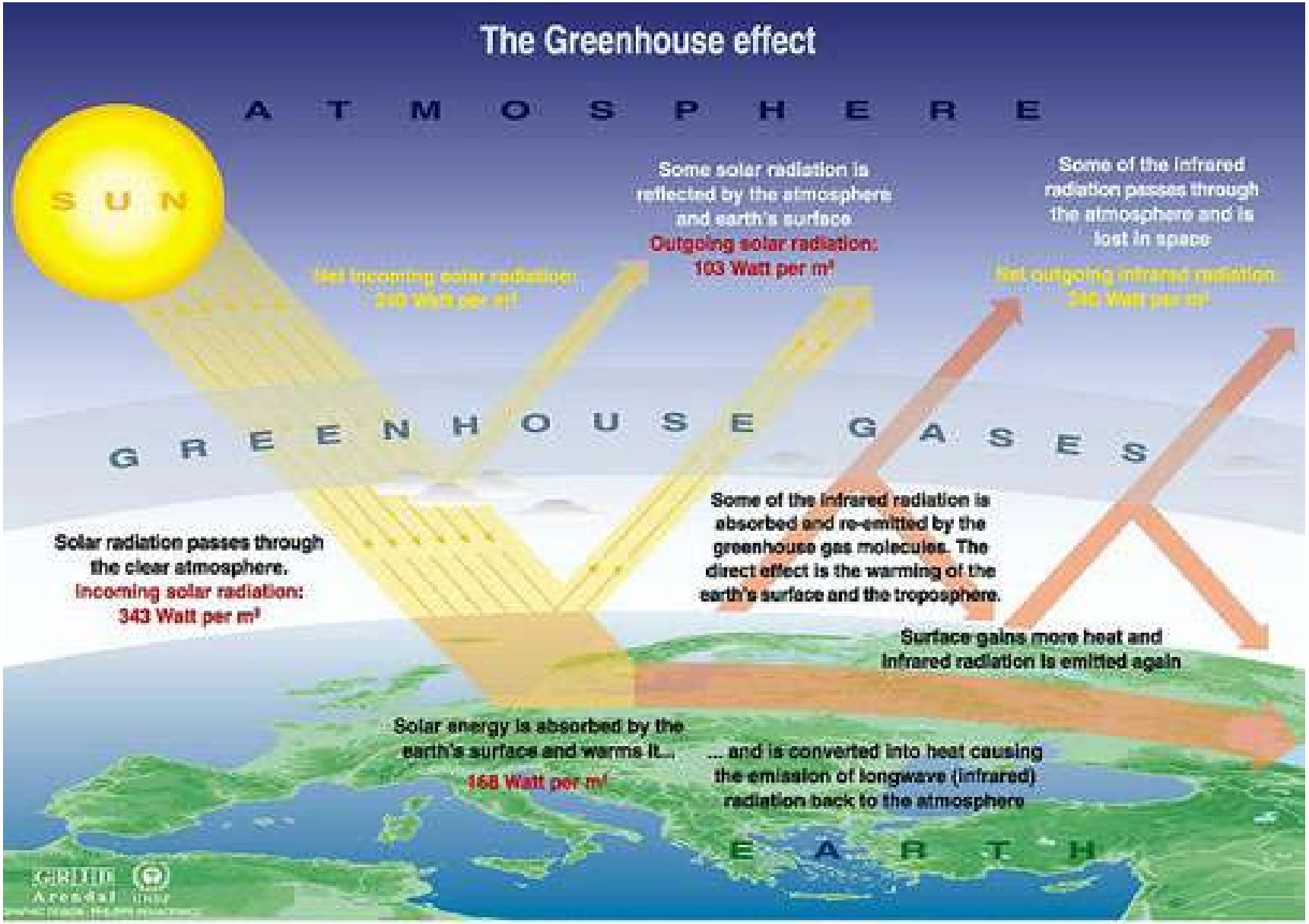
Global Temperatures

- Global warming = could be caused by cyclic pattern of sun spots or human activities
- Global temps have been steadily increasing since 1950's

The Greenhouse Effect

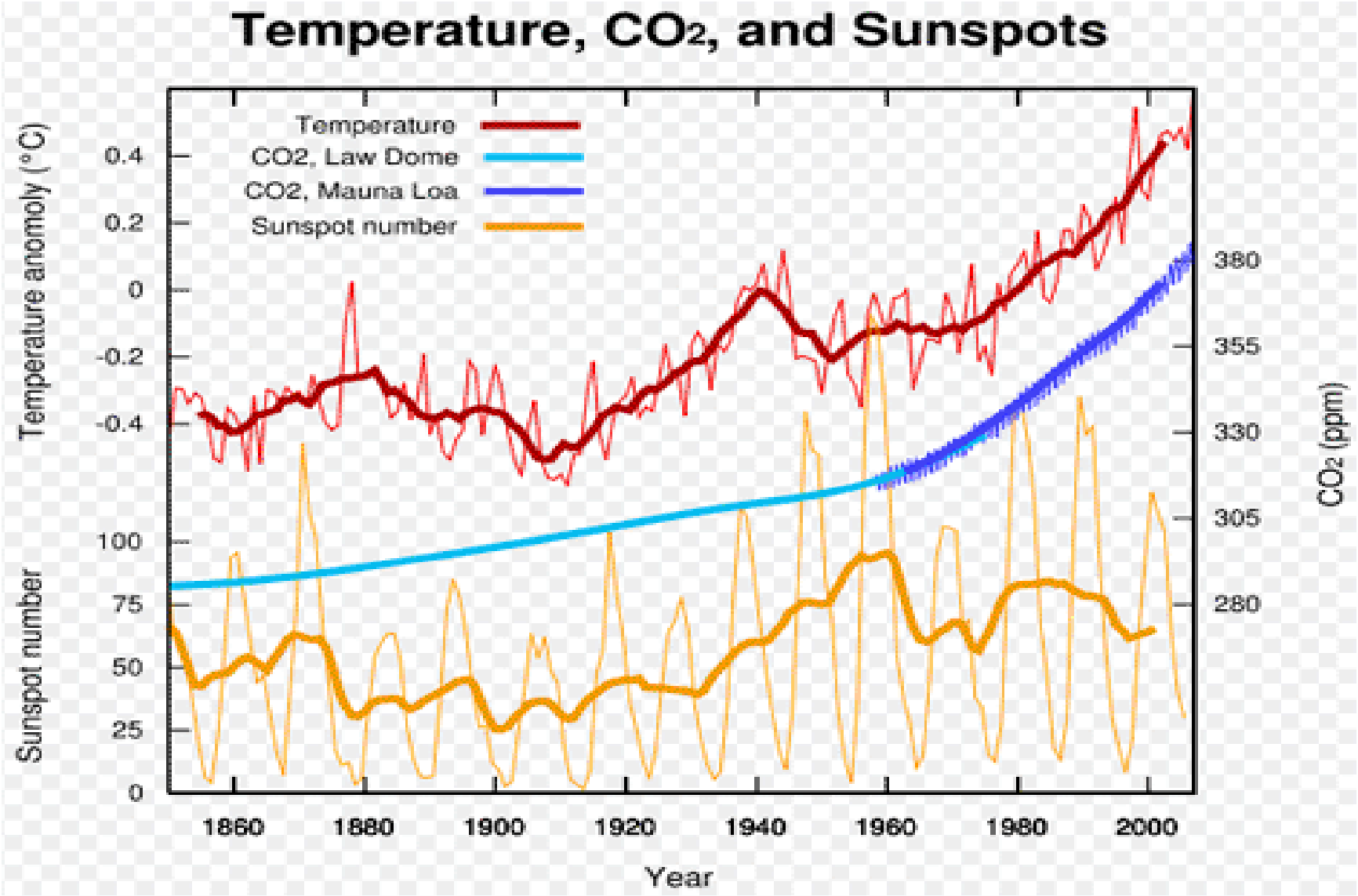
- Greenhouse gases keep the earth warm
  - Water vapor, carbon dioxide, methane, nitrous oxide
  - Carbon dioxide production on earth has increased significantly
  - Chemical bonds in CO_2 absorb energy from the sun and produce heat
  - More CO_2 = more heat
  - CO_2 is produced when fossil fuels are burned

www.halifax.ca/climate/climatec.html



Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1996.

- www.bbc.co.uk/.../greenhouse_effect_img.shtml



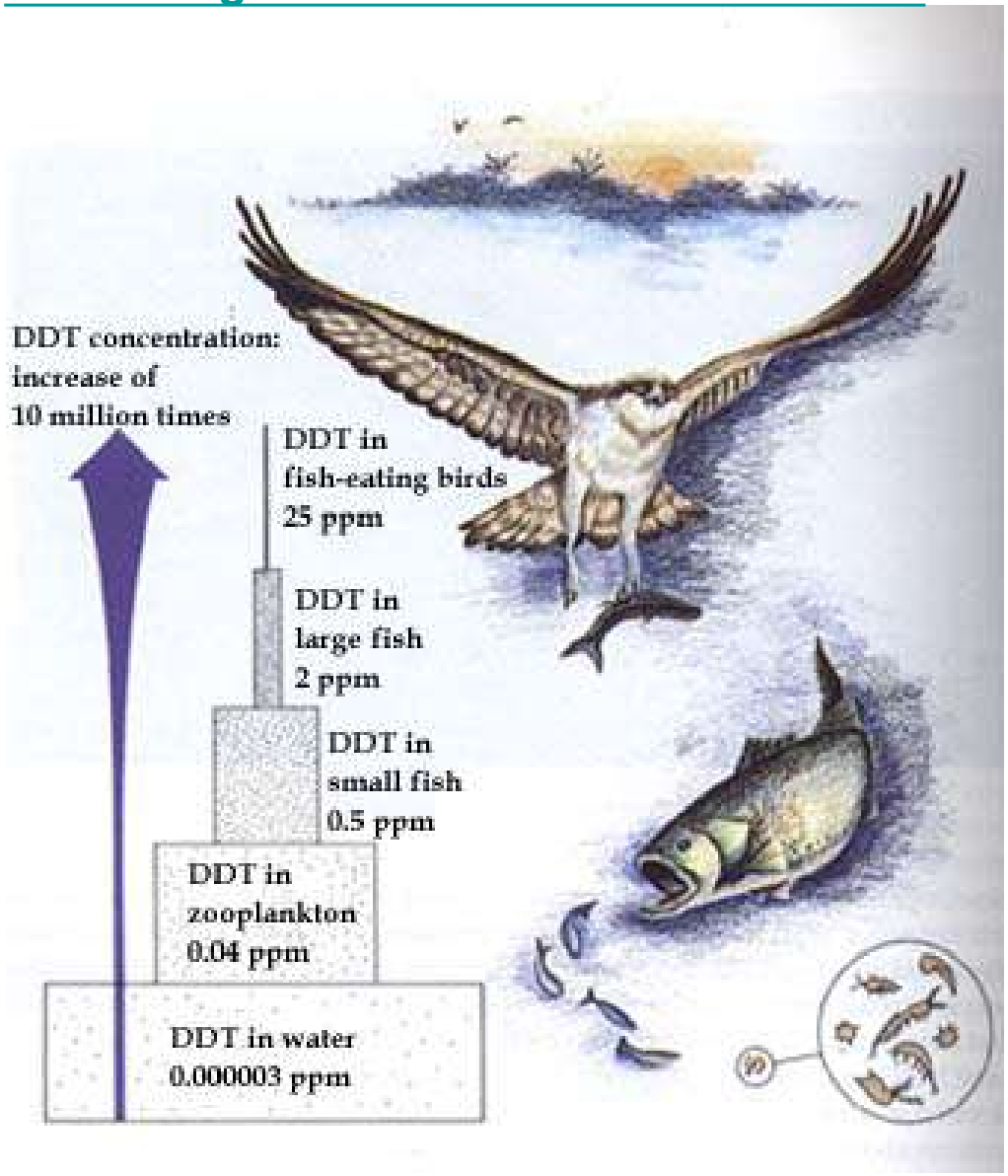
Effects of Chemical Pollution

- Oil spills
- Toxic chemicals such as mercury, pesticides
- These chemical pollutants poison everything in their paths. Most are dumped into rivers and streams.

Agricultural Chemicals

- Pesticides, herbicides, fertilizers
- DDT
  - Breaks down slowly in environment
  - Stored in fatty tissues of animals
  - As DDT is passed through the trophic levels of the food chain, its affect is magnified = biological magnification
  - DDT in birds caused thin fragile egg shells
  - Populations decreased
  - Use of DDT was strictly prohibited in US but other countries still use it.

www.fws.gov/contaminants/Info/DDT.cfm



Loss of Resources

- 3 sources of nonrenewable resources are being destroyed at an alarming rate:
  - species of living things
    - destruction of rain forests
    - eliminates bad diseases and pests
    - BUT some good and useful organisms possibly exist there as well
    - The world will never know

Loss of Resources

- topsoil
  - top soil is dwindling by several centimeters each decade
  - not replaceable
  - topsoil is lost by:
    - tilling land
    - overgrazing in pastures
    - practicing poor land management
  - all these remove topsoil layers by allowing wind and water to erode the soil

Loss of Resources

- water
  - Ground water pollution and depletion
  - Avoid watering lawns, leaky faucets, washing cars
  - Report chemical contamination if known
  - Once polluted, it remains polluted as it seeps into the ground water and aquifers

Growth of the Human Population

- Human population is growing faster than they are dying
  - Birth rate = 21 births per 1000 people per year
  - Death rate = 9 deaths per 1000 people per year.
  - In 60 years, if the current rates remain the same, the world's population could double!!

Worldwide rates of Growth

- 260,000 people are added every day or 180 people per minute
- Populations are growing fastest in developing areas of Asia, Africa, and Latin America
- Population growth seems to be highest in areas that can least afford it (already strained resources)
- Will the world reach its carrying capacity???
- What would happen next?

Solving Environmental Problems

- 1990's – worldwide increase in efforts to reduce pollution
  - Stop CFC production
  - Release of insecticide and agricultural chemicals (DDT, asbestos, dioxin) is restricted in US

Solving Environmental Problems

- Reducing air and water pollution
  - Sewage treatment is removing chemicals as well as bacteria
  - Factory smokestacks have scrubbers that reduce the sulfur dioxide, soot, and carbon dioxide emissions by 30%
- Reducing number of cars on roads by making restricted lanes for cars that are carrying many occupants (HOV)

In the USA

- Clean Air Act of 1990
  - Requires all cars to have catalytic converters to reduce emissions
  - Requires all factory smokestacks to have scrubbers

In the USA

- Taxes
  - Gasoline taxes
    - Increase tax during times of high consumption
    - Encourages carpooling???

Your Contribution

- Reduce pollution
- Carpool
- Recycle
- Buy “green” items only
- We may not see the immediate results of our conservation efforts, but our children and grandchildren will hopefully benefit from it!!!