B. Ozone Depletion:

Ozone (O_3) absorbs a portion of the ultraviolet radiation that is contained in sunlight. The reduction in the amount of ozone allows more ultraviolet rays to reach the Earth's surface. Ultraviolet light is high energy light that can cause chromosomal damage. While being a different issue than global warming, the changes in species and bio-diversity brought about through mutation caused by increased ultraviolet may indirectly have some effect on climate.

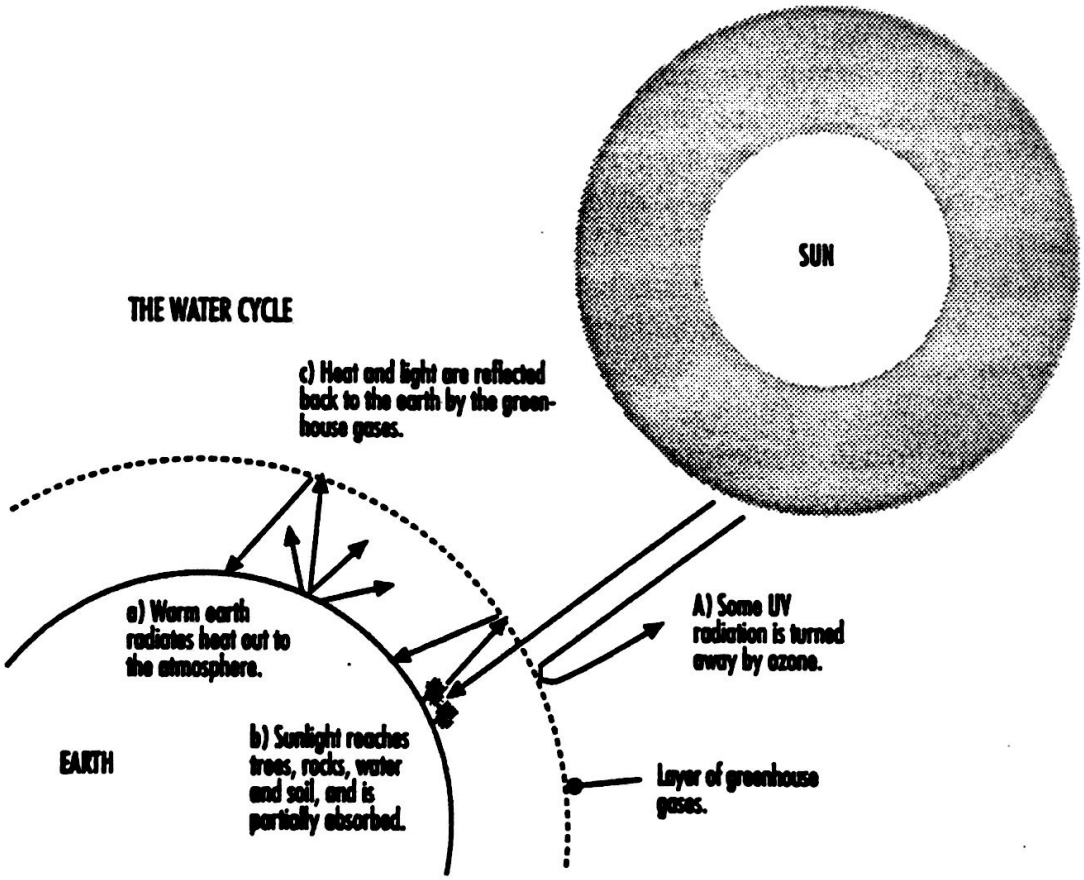
C. Deforestation:

The world's forests are being cut down to provide land for agriculture and wood for fuel and shelter for an increasing human population. Forests are also cleared so that roads can be built and land can be mined. This loss of forest can affect the world's weather. The leaves of forest trees release large amounts of moisture into the atmosphere maintaining atmospheric water levels that is a critical part of the water cycle. Trees also take in large amounts of carbon dioxide which helps to lessen the greenhouse effect. Trees have deep roots that hold soil in place and prevent erosion. Many of the world's deserts are expanding due to erosion caused by the removal of trees.

D. Acid Rain:

This refers to the increased acidity of all forms of precipitation caused by pollutants such as sulfur dioxide and nitrogen oxides in the atmosphere. Combustion of fossil fuels releases those substances into the air where they combine with water to form acids. The increased acidity can affect life forms in water and on land. Increased acidity of soil can cause a complete change in the type of flora that inhabit an area and could make the area unsuitable for any type of plant life. In water, a change in acidity affects all the creatures that live in that aquatic environment and could result in the sterilization of large bodies of water.

Warming of the Earth's atmosphere is caused by the presence in the atmosphere of certain gases including water vapor, carbon dioxide, and methane that absorb radiation emitted by the Earth's effectively trapping more heat near the Earth's surface. Human activity is increasing the proportion of these gases in the atmosphere, causing an increase in average global temperatures. This increase in the average temperature of the Earth that is a result of the greenhouse effect is called global warming. Global temperatures today are higher than at any other time since weather recording began. It is possible that this temperature increase will affect farming and food production. Low-lying farm land may flood as a result of rising sea levels caused by the melting of the polar ice caps. Other farmland will be subject to more drought-like conditions. As the climatic regions of the globe shift, so will the agricultural regions.



A. Global Warming / Greenhouse Effect

Without the greenhouse effect there would be no life on this planet as it is through naturally occurring processes that heat gets trapped in the atmosphere and the surface temperature of the planet rises to a point where life can be supported. Life on this planet has adapted to the amount of heating that occurs based on the amount of solar radiation being absorbed by the Earth's surface. Of the solar radiation that reaches the Earth about half reaches the surface. Some radiant energy is reflected back into space, the remainder is absorbed by the atmosphere and the clouds.

Given many of Edmonton's cold winters, your students will have difficulty believing that the greenhouse effect is increasing and contributing to global warming. Remind them that evidence for global warming is based on long term temperature averages and the data seems to indicate that the Earth is warming. An increase of just 3-4°C on a global scale can bring about great changes. It may be worthwhile noting that there are still scientists who do not believe the Earth will warm at all. Their reasoning is as follows: As the Earth warms up there is more evaporation. More evaporation means more cloud cover. More cloud cover means more solar radiation reflected back into space. This means less solar radiation being absorbed by the Earth's surface and therefore, less warming. In spite of the apparent logic of the argument outlined above, the majority of scientists believe that human activity is causing global warming. The extent of the warming is still subject to some debate. Weather which is only a few degrees warmer can:

- melt the South and North Pole ice caps, therefore adding water to the oceans which could flood low lying coastal regions.
- create desert like conditions where crops once grew.
- create water shortages in some areas.