

# Environmental Ethics

Creating a moral sense of environmental conservation in each person is called *environmental ethics*.



## **Environmental ethics:Issues. The Contrasting Views**

- Utilitarian justification (also known as individualistic ethics)
- Ecological justification (also known as moral justification)

## **Environmental Equity and Priority Principle**

Always respect all nature especially in cases where strong human rights are at stake

## **Environmental ethics: Possible Solutions**

- One should respect the power of environment and apply it for the benefits of humankind.
- One should place the highest priority on health, safety, and environmental protection while using environmental products.
- One should be sensitive to ethical and social issues regarding the environment.

# Methods to generate public awareness

The methods to generate environmental awareness generally falls in two categories :

## Formal Method

Introduction of Environmental Studies as a course in schools and colleges

## Non Formal Method

- Mass media such as newspapers, magazine, radio, T.V., etc
- Organizing meetings, seminars and conferences
- Organizing various competitions
- Through folk songs, street plays, TV serials, etc.

# Greenhouse Effect and Global Warming

## ❑ Weather

Weather is the condition of the atmosphere at a particular place and time

## ❑ Climate

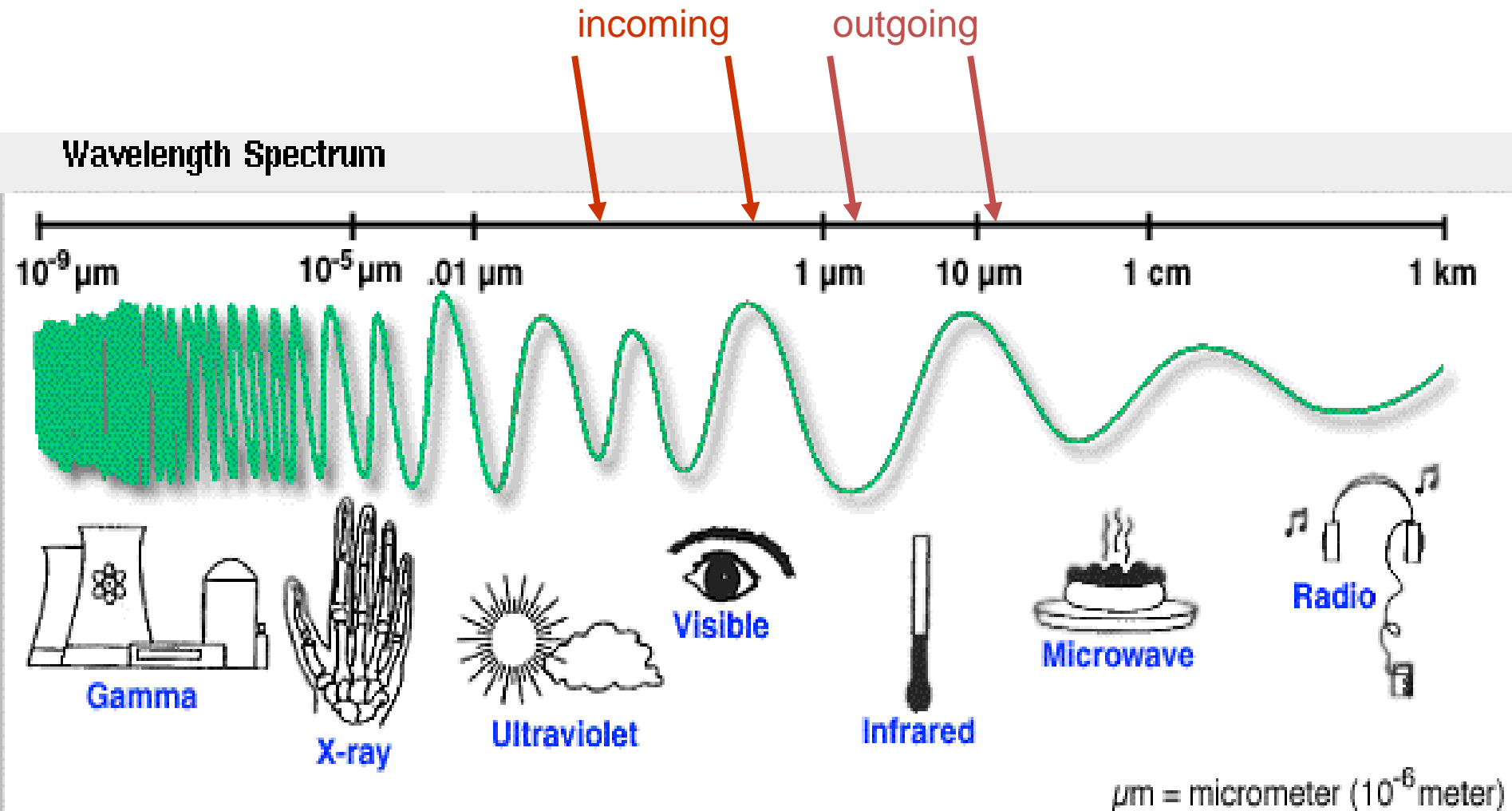
Climate change refers to the variation in Earth's global climate or in regional climates over time.

- ❑ The term greenhouse effect is used to indicate a heat-trapping process caused by gases such as carbon dioxide, and water vapour which are transparent to incoming solar radiations but re-emit the infrared radiations from Earth's surface
- ❑ Global warming is a long-term rise in the average temperature of Earth as a whole as a result of greenhouse effect.

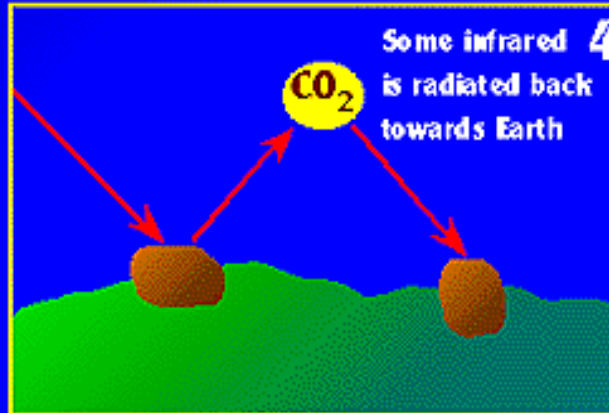
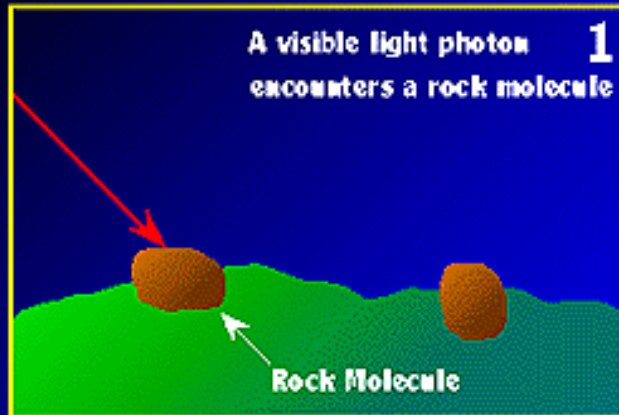


# Electromagnetic Spectrum

Wavelength Spectrum



# The Earth's Temperature - A Balancing Act

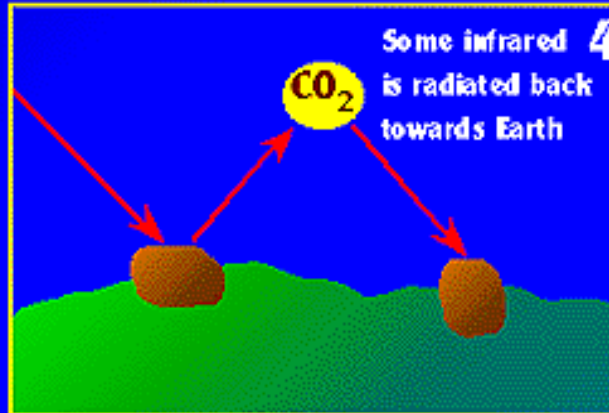
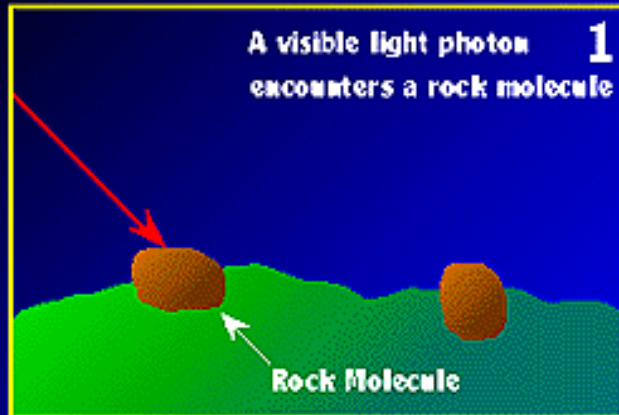


1. Shorter, high  
Energy wavelengths  
Hit the earth's  
Surface

2. Incoming energy  
Is converted to heat



# The Earth's Temperature - A Balancing Act



3. Longer, infrared Wavelengths hit Greenhouse gas Molecules in the atmosphere

4. Greenhouse gas Molecules in the Atmosphere emit Infrared radiation Back towards earth

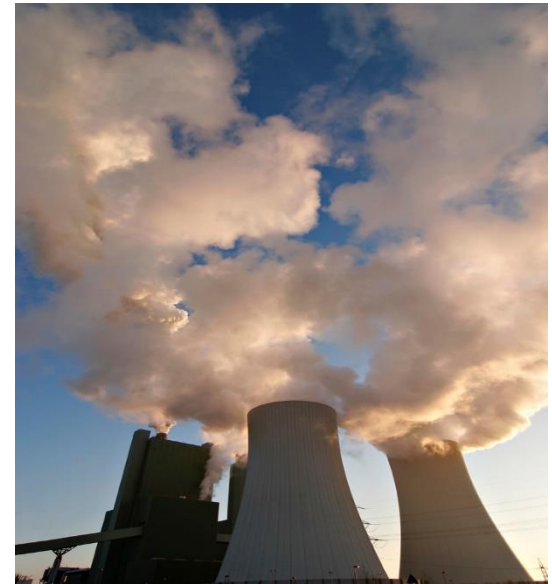


# Greenhouses Gases and Activities Responsible for Emission of Greenhouse Gases

- Carbon dioxide
- Methane
- Nitrous oxide
- Chlorofluoro carbons



- Fossil-fuel burning
- Industrial processes
- Deforestation
- Biomass burning
- Coal mining





# Effects of CO<sub>2</sub> increase

- Air and the Earth's surface may grow warmer.
- The stratosphere may become cooler.
- Temperate and polar regions may become warmer leading to the reduction in the ice cover of the earth.
- Rainfall may be higher than what it is present in the temperate regions.
- The greater amount of evaporation due to excess warmth .

# Environmental Effects of Global warming

- Climate change
- Rise in sea level
- Agricultural production
- Storms
- Adverse effects on human health
- Loss of ecosystems and biodiversity



## Control measures

- Reduction in the use of fossil fuels
- Shifting to the renewable energy sources that do not emit greenhouse gases
- Increasing the use of energy efficient and cleaner production technologies and practices
- Reducing deforestation, adopting better forest management practices, and undertaking afforestation to sequester carbon

# Acid Rain

Acid rain refers to a condition in which natural precipitation becomes acidic after reacting chemically with pollutants in the air.

## Causes of Acid Rain

Burning of the fuel as well as the use of nuclear weapons leading to the evolution of large amounts of sulphur dioxide ( $\text{SO}_2$ ) and nitrogen dioxide ( $\text{NO}_2$ ), which get converted to sulphurous acid and nitric acid, respectively.



## **Forests affected by Acid Rain**

Northeast US

Canada

Northern Europe

Asia





**How acid rain affects stonework.**

The picture on the left was taken in 1908.

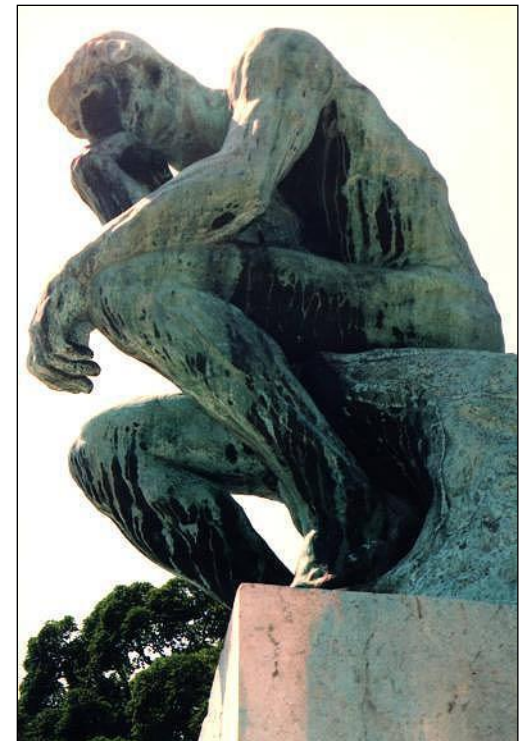
The picture on the right was taken in 1968





# Effects of Acid Rain

- Accelerates weathering in metal and stone structures
  - Eg. Parthenon in Athens, Greece; Taj Mahal in Agra, India





# Adverse Effects of Acid Rain

- Reduction in population of aquatic biota
- Damage to terrestrial ecosystems
- Corrosion of buildings
- Effect on human beings

# Ozone Layer and Its Depletion

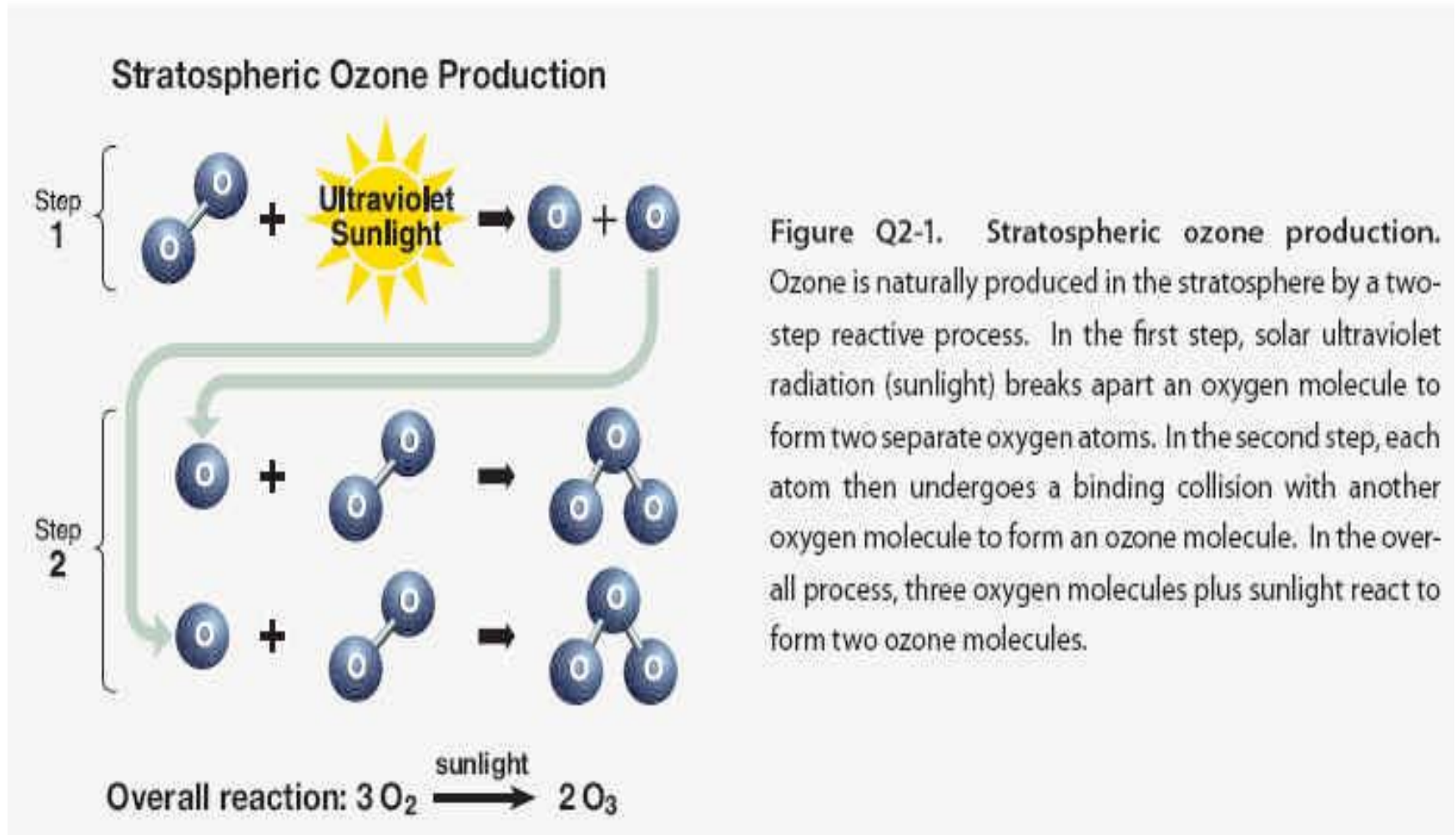
The decrease in the concentration of ozone ( $O_3$ ) in stratosphere is known as ozone layer depletion.

## Chief Cause

Widespread use of chlorofluorocarbons (CFCs)

# Chemistry of Ozone/Ozone Formation

Stratospheric ozone (O<sub>3</sub>) is produced by the combination of an oxygen atom (O) with an oxygen molecule (O<sub>2</sub>).



# CFCs

CFCs are powerful O<sub>3</sub> destroyers. They are used in the following ways:

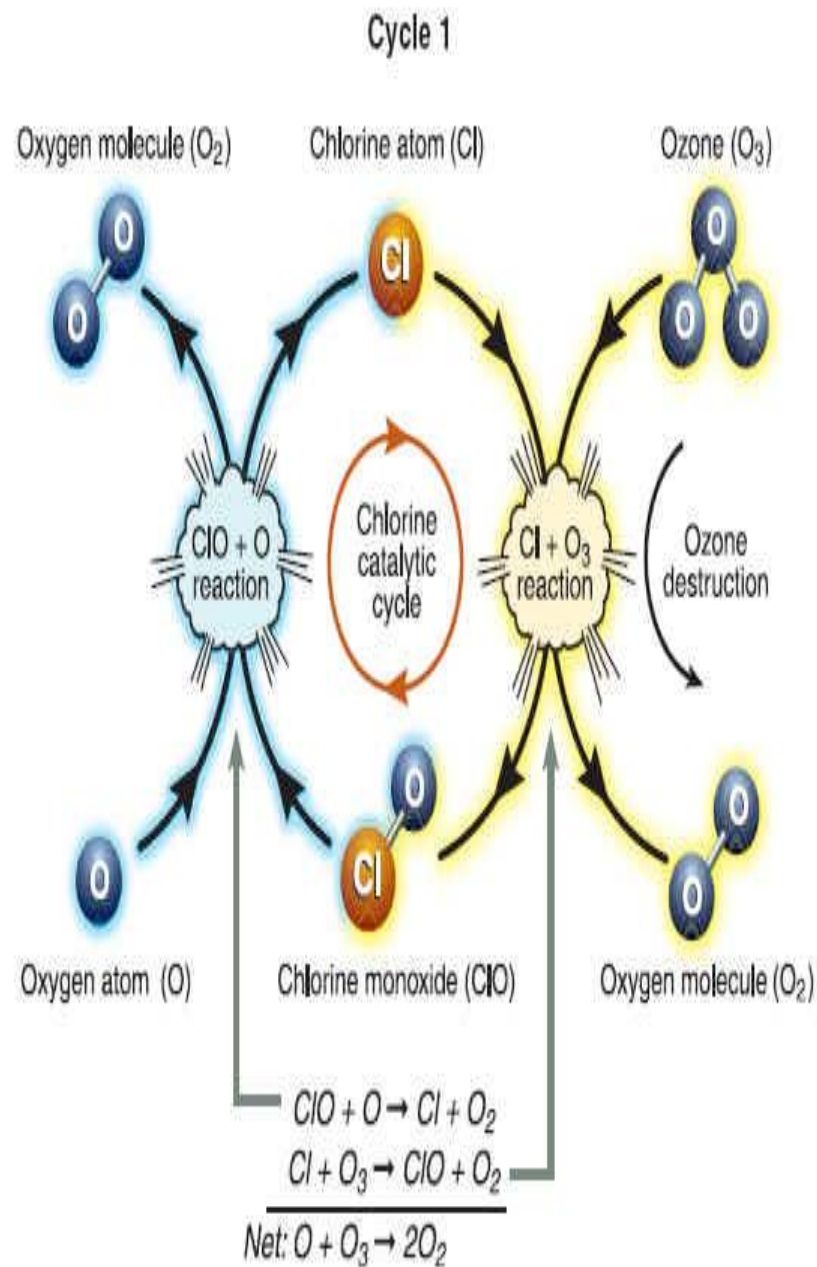
- As coolants in the compressors of refrigerators and air conditioners.
- To clean electronic circuit boards used in computers, telephones, etc.
- In the manufacture of foams for mattresses and cushions, disposable styrofoam cups, packaging material, cold storage, etc.

## Ozone Hole

The thinning of ozone layer or reduction in concentration of ozone especially over the area of Antarctic continent is known as ozone hole, which covers approximately seven million square kilometer.

# Mechanism of Ozone Layer Depletion

- a)  $\text{CFC} \xrightarrow{\text{UV}} \text{Cl}^\bullet$
- b)  $\text{O}_2 \xrightarrow{\text{UV C}} \text{O}^\bullet + \text{O}^\bullet$
- $\text{O}_2 + \text{O}^\bullet \longrightarrow \text{O}_3$
- $\text{O}_3 \xrightarrow{\text{UV B}} \text{O}_2 + \text{O}^\bullet$
- $\text{Cl}^\bullet + \text{O}^\bullet \longrightarrow \text{ClO}$
- c)  $\text{ClO} + \text{ClO} \longrightarrow \text{ClOOC1 (dim er)}$
- d)  $\text{ClOOC1} \longrightarrow \text{Cl}_2 + \text{O}_2$
- e)  $\text{Cl}_2 \longrightarrow \text{Cl}^\bullet + a$



# Environmental Effects of O<sub>3</sub> Layer Depletion

- Damage to land plants
- Decrease in population of aquatic community
- Increase in the rate of skin diseases and cancers in human beings
- Disturbance in climate patterns
- Corrosion of materials

## Control Measures

- Evolving substitutes for CFCs
- Development of hydrochloroflourocarbons and hydrofluorocarbons

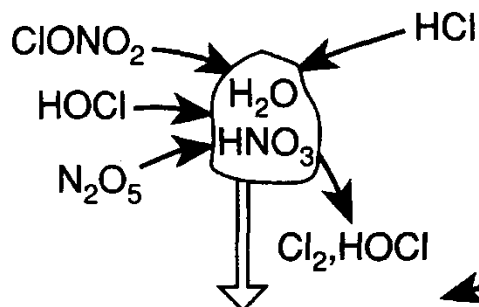
# The Ozone Hole

**In darkness**

**1 Formation of polar stratospheric clouds:**

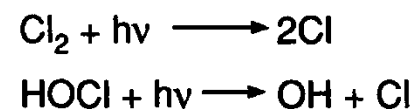


**2 Activation of  $\text{Cl}_x$ :**

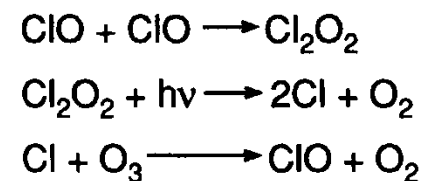


**In the light of the rising spring sun**

**Formation of  $\text{ClO}_x$ :**



**Catalytic ozone depletion:**



cold, isolated  
polar vortex  
-80°C

Stratosphere

Troposphere

Antarctica

9 km



Weather is the condition of–

- (a) the atmosphere at a particular place and time
- (b) average atmosphere of last 100 years of a country
- (c) average atmosphere of last 1000 years of a country
- (d) only moisture in sea

Green house effect is

- (a) emission of green coloured gas
- (b) heat trapping process by gas
- (c) effect of green vegetables on health
- (d) effect of green building on environment.

Which of the statement is true?

- (a) global warming is the effect of excess green house effect
- (b) there is no relation between global warming and green house effect
- (c) global warming means afforestation
- (d) none of the statement is true.

Which of the following is NOT green house gas?

- (a) CH<sub>4</sub> (b) CO<sub>2</sub> (c) CFC (d) N<sub>2</sub>

Which of the following is green house gas?

(a)  $O_3$  (b)  $Cl_2$  (c)  $O_2$  (d)  $N_2$

Which of the following is responsible for global warming?

(a) deforestation (b) burning of fossil fuel (c) coal mining (d) all of these

Which initiative was taken to reduce global warming?

(a) Kyoto Protocol (b) Montreal protocol (c) Global protocol (d) Earth protocol

Which initiative was taken to reduce ozone layer depression?

(a) Kyoto Protocol (b) Montreal protocol (c) Global protocol (d) Earth protocol

Which gas is directly responsible for acid rain?

(a)  $SO_2$  (b)  $O_2$  (c)  $N_2$  (d)  $Br_2$

What is the full name of CFC?

(a) chloro fluoro carbon (b) chloro fine carbon (c) carbon floated chlorine  
(d) chlorine floated carbon

**Issues involved in the enforcement of environmental legislation is:**

- a. Illiteracy
- b. Ignorance
- c. Economic reasons
- d. All of these

**Illiteracy, Ignorance, Economic reasons are issues involved in**

- a. Enforcement of environmental legislation
- b. Air (Prevention and control of pollution) Act
- c. Act Wild life Protection
- d. None of these

**The environmental planning is:**

- a. The analysis of how we can increase poaching of environment
- b. The analysis of how people impact natural resources
- c. The supply of management tool to destroy our environment
- d. The analysis of how we can increase deforestation

**The legislation that is truly a milestone in the field of environmental protection was enacted in:**

- A. 1986      B. 1995      C. 1991      D. 1994

**The objectives of Water (Prevention and control of pollution) Act, 1986**

- a. To prevent, control and maintenance or restoration of water.
- b. To establish standards of the water quality and effluent
- c. Polluting industries must seek the permission to discharge the waste into effluent bodies.
- d. All of the above

**Kyoto protocol is assigned for**

- a. Reduction of greenhouse gas emission
- b. Reduction of acid rain
- c. Plantation of trees
- d. None of these

**Montreal protocol is assigned for**

- a. Protection of ozone layer
- b. Production of greenhouse gas emission
- c. Production of acid rain
- d. Plantation of trees

**What is Kyoto Protocol?**

- A. It is an agreement among countries to take steps for reducing global warming.
- B. It is an agreement among countries to take steps for reducing acid rain.
- C. It is an agreement among countries to take steps for planting trees to control pollution.
- D. It is an agreement among countries to start using nuclear energy.

**The protocol assign for reduction of greenhouse gas emission is:**

- a. Kyoto protocol
- b. Montreal protocol
- c. Vienna protocol
- d. None of these

**The protocol assign for protection of ozone layer is:**

- a. Kyoto protocol
- b. Montreal protocol
- c. Vienna protocol
- c. None of these

Which of the following is correct for the birth rate in a geographical area?

- (a) Number of births per hundred people
- (b) Number of births per thousand people
- (c) Total number of births in a month
- (d) Total number of births in a year

Number of death per thousand people in a geographical area is known as ...

- (a) Death zone
- (b) Death rate
- (c) Deaths per people
- (d) Total death

Industrial accident is an example of

- a. Man-made Disasters
- b. Natural disaster
- c. (a) and (b) both
- d. None of these

Which of the following is the type of Floods

Coastal

Hydrological

Agricultural

Meteorological

Natural phenomena during which large amounts of landmass slide downwards from hilly areas is known as

Earthquake

Landslides

Flood

Hurricanes

Hurricanes is an example of ----- related natural disaster

Water

Air

Earth

All of the above

Flood is an example of ----- related natural disaster

Water

Air

Earth

All of the above

Illiteracy, Ignorance, Economic reasons are issues involved in

- (a) Enforcement of environmental legislation
- (b) Air (Prevention and control of pollution) Act
- (c) Act Wild life Protection
- (d) None of these

What will you call the rate of change in population for a specific area which is affected by the movement of people into and out of the area?

- (a) Migration
- (b) Defection
- (c) Departure
- (d) Moving abroad

What is the effect of the improvement in medical facilities and cure for dreaded diseases, on population growth?

- (a) Decrease in birth rate hence decrease in population
- (b) Decrease in death rate hence increase in population
- (c) Increase in death rate hence decrease in population
- (d) No effect observed on population growth