INTRODUCTION

Some of the environmental problems are not confined to a particular area or a country, rather they have global impact. Three problems which pose a serious threat to global environment are ozone layer depletion, greenhouse effect and global warming. These are interrelated problems and are caused by the presence of large quantities of harmful gases which are released into the atmosphere by indiscriminate and unwanted activities of man.

OZONE LAYER DEPLETION

Ozone is a form of oxygen with three atoms instead of the normal two and is chemically denoted as O3. It is bluish gas and gives pleasant smell if found in small quantities. It is formed when oxygen molecules in the atmosphere are broken up by ultraviolet solar radiation or by electric discharge during thunderstorms. It provides a safety shield from the ultraviolet radiations coming from the sun.

CAUSES OF OZONE DEPLETION

Increasing use of chlorofluorocarbons (CFCs) used in refrigerators, air conditioners, spray cars, insulation materials, cleaning fluids results in the discharge of chemical pollutants in the air. Space probes are said to be responsible for the depletion of ozone layer. The third cause of ozone layer depletion is due to oxides of nitrogen released from supersonic aircrafts, automobile exhausts, use of nitrates as fertilizers in agriculture, etc.

OZONE HOLE

Scientists studying the atmosphere from Antarctica first suspected in 1970s that ozone layer was thinning. Part of the ozone layer with little or no ozone is known as ozone hole. The more alarming thing is that the hole is increasing. Ozone hole as large as the size of the USA or the entire continent of Europe was detected by the British scientists in 1987.

Countries like New Zealand, Australia, South Africa, Argentina, Chile, etc. are at much greater risk.

Another hole has been detected over the Arctic region.

According to the Chinese scientists, a third ozone hole is at its initial stage over the Tibet plateau.
EFFECTS OF OZONE LAYER DEPLETION

Increase in UV rays due to ozone layer depletion, can lead to skin cancer, cataract and blindness. It seriously damages the immune system.
Development of smog due to the increase in UV rays over big cities causes respiratory problems.
Ozone layer depletion badly effects vegetation, wildlife and aquatic life.
Increased concentration of UV rays can cause climatic changes all over the world.

SAFEGUARDS AGAINST OZONE LAYER DEPLETION

- Reducing the production and consumption of CFCs.
- Finding substitutes for CFCs like Dry Ice.
Damage to the ozone layer is a solvable problem, although it will take at least 70 years for the layer to recover from the worst damage inflicted so far. Most of the developed countries have stopped making CFCs and the developing countries are trying to follow suit.

**THE GREENHOUSE EFFECT**

![Greenhouse Effect Diagram](image)

Literally speaking greenhouse is the name given to a glass house which is used for protecting delicate and rare plants that require warmth. The earth’s atmosphere behaves the same way as the glass panels of greenhouse. The gases present in the atmosphere allow ultraviolet short wave radiations to reach the earth’s surface but the same gases obstruct long wave infra red radiations reflected by the earth’s surface. As a result, more heat enters the atmosphere than the amount of heat which leaves it. Without natural “greenhouse effect” the earth would be as cold as the moon and no life could be possible on the earth.

**GREEN HOUSE GASES AND THEIR SOURCES**

Carbon dioxide, methane and water vapour are three most important greenhouse gases and their concentration in the atmosphere is increased by:

- Burning of **Coal, Oil, Gas and Wood** for domestic and Industrial purposes.
- Destruction of forest cover by natural and human activities.
WHAT IS GLOBAL WARMING?

As the level of carbon dioxide and other greenhouse gases in the atmosphere increases, its capacity to absorb heat increases and its temperature rises. This is known as global warming.

Although global warming is worldwide problem, yet advanced countries are more responsible for such sad state of affairs as compared to developing and underdeveloped countries.

EFFECTS OF GLOBAL WARMING

- Climatic change due to Global Warming will affect world food production and lead to famine and mass starvation.
- Some of the animals not able to adjust themselves to the changing climatic conditions may become extinct or endangered.
- Glaciers are melting at a much faster speed.
- Rivers originating from them will be first flooded due to excess water by melting glaciers.
- There will be widespread drought conditions after the glaciers melt out.
- Large scale melting of glaciers all over the world, results in larger amount of water entering the sea through rivers thereby raising the sea level.
- Small low lying islands like Maldives, Bali Hawaii and Coral islands will be flooded.
When natural precipitation becomes acidic after reacting chemically with pollutants in air, it is called **acid rain**.

**Cause**: The main pollutants which cause acid rain are sulphur dioxide and oxides of nitrogen.

**Source**: These pollutants are released from a variety of sources such as industries, thermal power plant, and automobiles by using fossil fuels.

**Effects**:
- Northern Europe and Eastern North America are the worst sufferers by acid rain due to fast industrialisation of these areas.
- Acid rain causes serious damage to vegetation, soil, lakes, marine resources, monuments as well as on man.
- Many lakes in Canada have lost all their aquatic life and are called **dead lakes**.

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**INFO BANK**

Increase in the concentration of **CO2** in the atmosphere has been observed particularly after the Industrial Revolution. About 35-40% greenhouse effect is caused by methane and CFCs where they linger for 60-400 yrs.

Every time a space rocket is fired, 70-150 tonnes of chlorine is injected into the atmosphere.

**16th September** is observed as **International Ozone Day**.
EXERCISE

1. Choose the right option.
   1. After __________ there is an increase in CO2 in the atmosphere.
      a) greenhouse effect           b) industrial revolution             c) natural disaster
   2. Highest ozone concentration is found in the ________ .
      a) mesosphere                     b) troposphere                          c) stratosphere
   3. International Ozone day is celebrated on _____________.
      a) 16th May                        b) 16th September                      c) 16th November
   4. Lakes devoid of all aquatic life has been found in ____________.
      a) USA                               b) Europe                                   c) Canada
   5. Plants and animals consists the ____________ environment.
      a) physical                          b) natural                                   c) biological

2. Give one word for the followings.
   1. Bluish gas with a pleasant smell. _________________
   2. Full form of CFC.                        _________________
   3. The energy obtained from the remains of dead plants and animals. _____________
   4. The term describing our living and non-living environment _________________

3. Give reasons for the following.
   1. We have limited resource of fossil fuels.

   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________
2. Advanced countries are more responsible for global warming.

4. Answer the following questions.

1. Name the three areas where ozone hole has been detected.

2. What is ozone layer? What is its advantage?

3. What are the main causes of depletion of ozone layer?

4. Mention the safeguards which can be taken against ozone layer depletion.
5. Explain the effects of ozone layer depletion.

6. Define greenhouse effect.

7. What are the effects of global warming?

8. What is acid rain? How does it occur? What are the effects of acid rain?
9. ACTIVITIES.

a) Make a collage with pictures taken from newspapers and magazines on:
   How nature is reacting about the interference of human beings.

b) Collect information and pictures on how the world is coping with environmental crisis. Focus on:
   The problems faced by both developed and developing countries.
   The measures taken by the countries.
   Role of UN in minimising the environmental crisis.