OZONE DEPLETION
**OZONE LAYER**

The ozone layer is a layer in the earth’s atmosphere which contains **90%** of atmospheric ozone ($O_3$). The ozone layer is found in the lower portion of the stratosphere from about 20 to 30 km above earth’s surface. It’s thickness varies seasonally and geographically.
- **Ozone** is a colorless gas, it relatively simple molecule, consisting of three oxygen atoms bound together.
- **Ozone** is a highly-reactive form of oxygen. Near the Earth’s surface, hurt plant life, and damage people’s lung tissues.
- **Ozone** is a gas that occurs naturally in our atmosphere. Most of it is concentrated in the ozone layer, a region located in the stratosphere several miles above the surface of the Earth.
- **Ozone** also plays a vital role by shielding humans and other life from harmful ultraviolet “ultraviolet B”, light
STRATOSPHERE
Air temperature increases with height.

Ultraviolet radiation is absorbed, creating ozone layer in stratosphere

TROPOSPHERE
Air temperature decreases with height.

30,000 - 50,000 feet (6 - 10 miles)
Ozone absorbs the sun’s UV Rays, allowing just enough for life on earth.
OZONE DEPLETING SUBSTANCES

Ozone depleting substances are mainly CFC’s, HCFC’s, Halons, etc. which are found in Refrigerators, Cleaning agents, sprays, Pesticides, Air conditioners, car emissions, etc.
PROCESS OF OZONE DEPLETION

Due to solar radiation i.e. U.V. Rays CFC’s, HCFC’s breaks and form Cl atom which react with ozone molecule and forms Chlorine monoxide (\( \text{CIO} \)). Chlorine monoxide then reacts with oxygen radical to form Chlorine atom and molecular oxygen.
Impacts of Ozone Depletion

**Effect on Human Health:**
Damage genetic materials in the cells.
Leads to more people suffering from Cataracts.
Causes cancer, allergies and some other infectious disease.

10% depletion in ozone layer results in 30% increase in skin cancer infection.
EFFECT OF OZONE DEPLETION

Due to ozone depletion harmful U. V. Rays such as UV-B Radiation reaches to earth which leads to harmful effects on animals, plants, aquatic life as well as on humans also.

- **Effect on Aquatic System:** Affects phytoplankton, fish, larval crabs. Decrease in amount of phytoplankton increase the CO₂ in atmosphere which contribute the global warming.

- **Effect on Materials:** Degradation of paints and plastics.

- **Effect on Climate:** Global Warming (Increasing the Average temperature of the Earth’s surface).
Crops are killed
Ozone layer depletion damages plant & trees’ leaves & kills the plant & trees.

Crops are killed.
Solutions: Protecting the Ozone Layer

- Stop producing all ozone depleting substances
- CFC substitutes
  - HCFC’s - contain fewer chlorine atoms per molecule than CFC’s
  - HFC’s - contain Fluorine but no chlorine
  - HC’s - hydrocarbons - useful as coolants & insulating foam in refrigerators
Prevention of Ozone Depletion

- Use unleaded gasoline in vehicles
- Equip vehicles with catalytic converter
- Avoid smoking
- Replace CFC’s with HCFC’s
- Enforcement of Montreal Protocol
- Gain a better overall understanding on just how ozone depletion is affecting our planet
REMEDIAL MEASURES TO CONTROL THE DEPLETION OF OZONE LAYER

• (i) avoid any fire extinguisher that contain bromine based halons. Preferably use water, carbon dioxide or dry chemical fire extinguishers.

• (ii) spread awareness about the restricted use of cfcs for the healthy survival of mankind.

• (iii) avoid purchasing and using refrigerators, air conditioners etc. Which use cfcs, freons etc. As coolant.

• (iv) avoid purchasing and using pressurized aerosol cans which use cfcs, freons etc. As propellants.

• (V) ban atmospheric nuclear explosions, as they emit NO and deplete ozone layer.

• (Vi) reduce the air traffic of supersonic aircrafts that fly at the ozonosphere.
Protect the Ozone Layer
Save Life on Earth