SCIENCE

AIR POLLUTIONS

AIR POLLUTION

Our atmosphere contains many gases. Some of these gases are necessary for the existance of life on the earth. Due to urbanization and industrialization, many harmful compounds are released by the factories into the atmosphere. The presence of such undesirable substances in the air makes it unfit for breathing and is called as air pollution. Thus, the contamination of air with harmful toxic gases, smoke and dust, etc., is called air pollution.

The substance which cause pollution of the air are called air pollutants. Major air pollutants are:

(i) Carbon monoxide (ii) Carbon dioxide (iii) Sulphur dioxide

(iv) Nitrogen oxides (v) Smoke (vi) Dust

Burning of Fossil Fuels

The pollutants released during the burning of these fossil fuels are:

Fossil fuel	Pollutants released on burning
Wood	CO2,CO, Smoke
Coal	CO2,CO, SO2 Smoke
Petrol and diesel	CO2 CO, Oxides of nitrogen,Unburnt, Hydrocarbons, Lead compounds, Smoke
Kerosene	CO2,CO, Smoke
LPG	CO2, CO (traces)

All these pollutants released during the burning of fossil fuels cause air pollution. So, burning of fossil fuels causes air pollution.

Sources of Air Pollution

Air gets polluted due to various human activities as summarized below.

(i) **Burning/combustion of fuel:** Burning of fuel for household purposes generates gases like carbon dioxide, carbon monoxide as well as soot and particulate matter.

(ii) **Vehicular emission:** Gases emitted from the exhausts of motor vehicles contribute significantly to air pollution. These gases are nitrogen oxides, sulphur dioxide, carbon monoxide, carbon dioxide, hydrogen sulphide, etc.

(iii) **Industrial emission:** With the increase in population, the number of industries is increasing day by day. they emit harmful gases and smoke. For example, operations like mining of coal release coal dust into the atmosphere.

(iv) **Emmissions from power plants:** Thermal power plants and nuclear power plants release harmful gases, smoke and radioactive pollutants.

(v) **Deforestation:** Trees absorb substantial amount of carbon dioxide from the atmosphere. Hence, cutting of trees pullutes the environment by increasing the amount of carbon dioxide in the atmosphere.

(vi) Use of chlorofluorocarbons (CFCs) in refrigerators, fire extinguishers, aerosol sprays, etc. leads to release of harmful gases that deplete the ozone layer.

Effects of Air Pollution

The harmful effects of some air pollutants on living and non-living things.

- **Global Warming:** Increase in the concentration of carbon dioxide in the air is one of the major causes of global warming.

  The trapping of the sun's radiation by the gases present in the earth's atmosphere is called greenhouse effect.

  When the concentration of greenhouse gases CO_2 and methane increases in the atmosphere, they trap more heat. As a result, the earth's temperature increases leading to global warming. Thus, global warming can be defined as the increase in average temeprature of the earth's atmosphere that causes corresponding changes in climate.

  The causes of global warming are

  (i) deforestation

  (ii) burning of fossil fuels

  (iii) biological degradation of organic matter present in sewage which release methane gas.

❖ **Effects of Global Warming:**

- Increase in the earth's surface temeprature
- Melting of glaciers and polar ice caps
- Rise in the sea level which will lead to flooding of low lying and coastal areas

❖ **Acid Rain:** The oxides of sulphur and nitrogen present in the air react with water vapour and form sulphuric acid and nitric acid respectively. These acids come down with the rain making the rainwater significantly acidic. Such rain is called acid rain.

Effects of Acid Rain: Acid rain is quite corrosive and affect both living and non-living things adversely as stated below:

(i) Acid rain slowly erodes the cement, limestone and marble of buildings and corrodes steel and other metals. eg. erosion of the marble of Taj Mahal.
(ii) It destroys vegetation due to acidification of soil and accelerates leaching.
(iii) It acidifies the water of lakes and ponds and affects the survival of aquatic plants and animals.

❖ **Depletion of Ozone Layer:** The CFCs released by (refrigerators, air conditioners, sprays, etc.) in the atmosphere convert ozone into oxygen. This reduces the amount of ozone in the ozone layer and creates a hole in it.

The depletion of ozone layer affects the health of animals and human beings who are now exposed to a higher level of UV radiation. They may develop skin cancer and eye problems if exposed to these rays for prolonged period. Exposure to UV rays affects the crops also adversely.

❖ **Prevention of Air Pollution:**

(i) Use modified automobile engines where complete combustion of fuel takes place. Get exhaust gases checked regularly.
(ii) Use less polluting fuels like unleaded petrol and CNG (Compressed Natural Gas) to keep the air clean.
(iii) We should use alternative sources of energy like solar energy, hydropower, tidal energy, nuclear energy, etc. instead of fossil fuels to meet our energy requirements.
(iv) Planting as many trees as possible in the surroundings helps to clean the air.

❖ **Affect of Air Pollutants :** Pollutants in the air cause many diseases and reactions in human beings.

	Air pollutants	Effects
1	Dust	Allergic reactions
2	Smoke	Respiratory problems
3	CO	Respiratory problems, may even lead to death
4	CO2 (excess)	Greenhouse effect— atmospheric temperature rises
5	SO2 and SO3	Damage lungs, produce acid rain and cause corrosion
6	Oxides of nitrogen	Lung congestion, produce smog