

Pollution

Introduction:

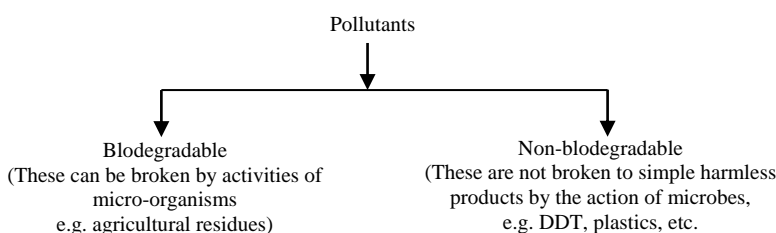
The living beings and the non-living substances around us, water bodies and land are the major components of our environment, which have been affected by various human activities. At the same time the animals, birds and other creatures are also affected.

When the components of environment become unclean or infected we say that the environment has been polluted.

Definition

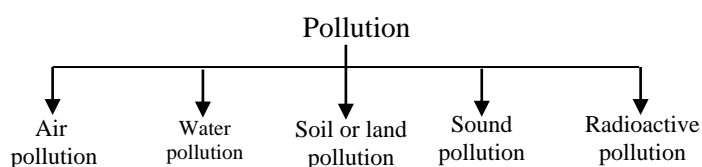
“The unwanted changes in physical, chemical and biological states of environment which adversely affect human beings and many other living beings, vegetation or symbols of beauty, are known as environmental pollution”.

The substances which cause pollution are called pollutants.



Types of Environment Pollution

Environmental pollution may be divided into the following categories:



Water Pollution

Sewage of the cities and waste materials from industries may pollute ponds, tanks or rivers. This water becomes unsuitable for drinking purposes.

(a) Importance of Clean Water:

Man, animals and birds, vegetation, etc., and all types of life need water. Approximately 65% of man's weight is water. Man may live without food for several days but it is not possible to stay alive without water.

The most important use of water in living beings is under to its dissolving effect. Water plays an

important part in balancing the body temperature. Blood and all the fluids of the body retain their mobility due to the presence of water. In aqueous medium, ionization of salts continuously provide important ions like Na^+ , K^+ , Cl^- , etc. to our body. Water used for drinking purposes is potable water.

Apart from this, water is used in large quantities for preparing food, in drug manufacture, washing, industries etc.

Only 1% of world's water is usable to us. 97% is salty sea water and 2% is frozen in glaciers and polar ice caps.

Important terms related to water:

Dew is formed on cold cloudless nights. The moisture in the warm air condenses when it comes in contact with grass, flowers or plant leaves.

Dew is frozen to form frost if the temperature at the time of condensation is 0°C or below.

Rain is caused when moisture laden winds come across mountains or hills in their path.

Snow is water vapour changed into small solid crystals. The crystals combine to form snow flakes. In colder regions, when the temperature at the time of condensation is 0°C or below, snow flakes come down as fluffy cotton descending from above.

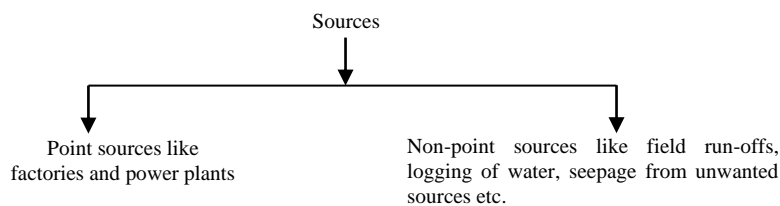
When clouds float up into very cold regions. The rain drops are frozen as hails.

Fog is formed when condensation takes place at or near earth's surface. It becomes impossible to see beyond a very small distance even during the day.

Pure water has the following properties:

- (i) Pure water is transparent and is without any colour or odour.
- (ii) Melting point of pure water is 0°C and boiling point is 100°C
- (iii) Pure water is free from all kinds of bacteria and viruses.
- (iv) Pure water is neither acidic nor alkaline. It is completely neutral.
- (v) It contains dissolved oxygen in sufficient amount.
- (vi) It is devoid of all types of soluble, insoluble or colloidal impurities.

(b) Sources of Water Pollution:



(i) Sewage:

Sewage is a kind of fluid waste, which contains human excreta, waste water from bathrooms and kitchens, paper, pieces of clothes and other waste materials.

(ii) Municipal waste:

Municipal waste or city garbage includes waste from kitchen, papers, rags, old shoes, polythene bags, bottles, toothpaste tubes and many such things. Highly infected hospital waste also becomes the part of municipal waste in most of the cities and towns.

(iii) Water pollution by animals, human beings and dead bodies:

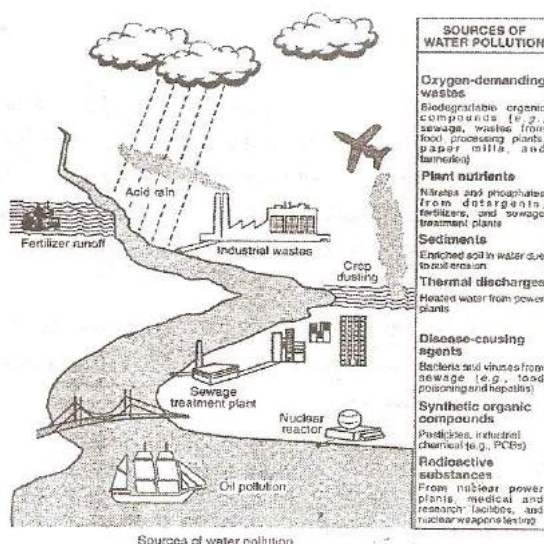
Animals found in villages, towns and cities like cows, buffaloes, dogs, pigs, etc., bathe in water sources and pollute them. Washing clothes in water sources, washing trucks, buses and other vehicles by human beings causes water pollution. Dumping dead bodies in water sources causes serious water pollution.

(iv) Industrial effluents:

After its use water loaded with impurities is allowed to flow outside the industry's campus. This fluid is known as industrial effluent. This effluent reaches water sources and pollutes them. Industrial effluents contain many inorganic and organic pollutants, such as metals, oil. Grease, plastic, phenol, toxins etc.

(v) Oil stick:

Petroleum is one of the major pollutants which pollute sea water.



(C) Effects of Water Pollution on Human Life:

(i) Effects of polluted potable water:

The bacteria found in polluted water are responsible for many diseases, such as cholera, typhoid fever, infantile diarrhea, dysentery, etc. various viruses present in water also cause a number of diseases such as polio, jaundice, infections, hepatitis etc. certain parasites like ascaris and tapeworm reach the intestine through polluted water and cause diseases.

(ii) Effect of external contact of polluted water:-

On taking bath in polluted water of a pond, lake or river, parasites present in it enter the body through skin and cause diseases such as schistosomiasis, leptospirosis etc.

Schistosomiasis is also called snail fever as it is more commonly seen in areas with water which is contaminated with fresh water snail which contain the parasite (schistosome). Leptospirosis is caused by exposure to water contaminated with animal urine specially that of rodents.

(iii) Effects of toxic metals present in polluted water:

Heavy metals such as copper, chromium, zinc, cadmium, lead, mercury etc. are present in water polluted by industries. In 1953, a large number of people died in Japan and Sweden due to Mina Mata epidemic, which was caused by mercury effects in liver and testes. In Japan itai itai Viso disease was caused due to cadmium pollution. In this disease arms and legs become weak and experience sharp pain.

(iv) Effects of fluoride ions present

The ill effects of fluoride ions present in drinking water are termed as fluorosis in which teeth and bones are affected.

(d) Water Conservation:

97% water present on earth is in the form of oceans and the remaining 3% is present in the form of various sources of water. Today water pollution has increased to such an extent that most of the water sources have been polluted.

Following measures may be taken to conserve water:

(i) Do not allow water to flow unnecessarily:

If the taps in the houses are damaged then water will keep trickling continuously or stream of water may flow continuously. Therefore the taps must be immediately repaired or changed.

(ii) If the service line of water has damaged at any place, we should inform the concerning department, so that they may repair it to stop the wastage of water.

(iii) It has been observed that the water taps at public places are found missing and water continuously flows on the roads or towards the nearby drainage. In such a situation, it is better to get the tap fixed in the pipeline with the help of public.

(iv) It has also been observed that when people go out from their homes, they leave the taps open and whenever water is supplied, it just goes waste. Therefore we must check the taps whenever we go out.

(v) Sometimes small children open the water taps while playing. This also causes wastage of water.

(vi) Waste water from kitchen and bathroom may be collected in tank and this water may then be used in the kitchen garden or in bathrooms.

(e) Control of Water Pollution:

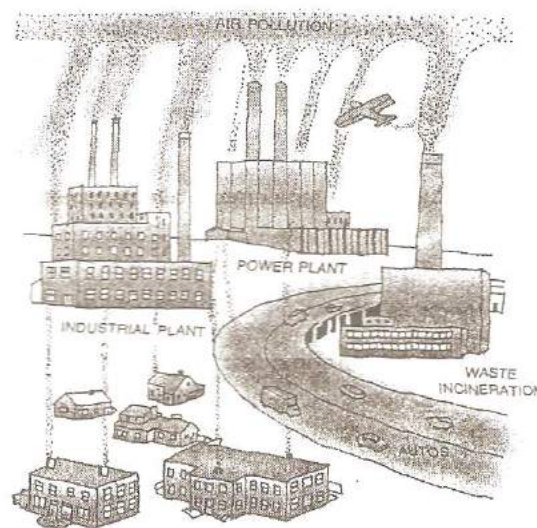
(i) Septic tanks should be used for each house.

(ii) Rivers, lakes etc. should not be used for bathing and washing purposes.

(iii) Too much use of pesticides which are not degradable should be avoided.

(iv) Water reuse has a special significance in mining and similar industries where the water availability is less.

(v) Waste water treatment techniques should be applied before the polluted water enters a river, lake or pool.



(b) Effects of some common Air Pollutants:

(i) **Carbon dioxide:** Carbon dioxide is released in the atmosphere by the following sources:

(A) Burning of fossil fuels.

(B) Burning of fuels in automobiles, railways diesel engines, boats and ships, aircrafts, etc.

(C) Respiration

Carbon dioxide does not have a poisonous effect like carbon monoxide on living beings. Its increase in atmosphere is mainly responsible for global warming.

Global warming or green house effect:

Sunrays reach the earth's surface after passing through the atmosphere. These radiations produce heat on earth. This heat is again radiated towards outer space. Gases (CO_2 , CH_4 , NO etc.) and water vapours present in atmosphere absorb these radiations and these are again radiated towards earth. This process increases earth's temperature and is known as green house effect. The gases responsible for this effect are known as green house gases.

As a result of the green house effect, the earth's temperature increases, which in turn is responsible for the following environmental hazards:

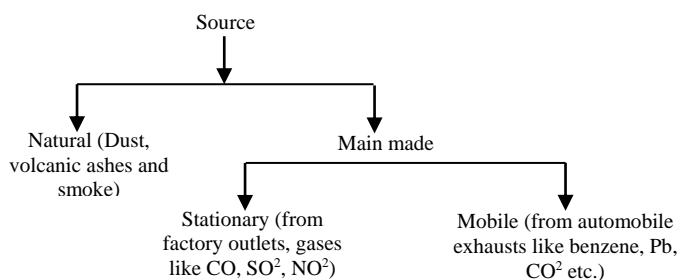
(A) **Melting of ice at poles:** A slight increase in earth's temperature is capable of melting a large quantity of ice deposits at poles. This will increase the water level in various oceans. As a result island and sea-side cities will be submerged in water.

(B) Increase in world's temperature may cause cyclones and violent storms which in turn may cause heavy loss of lives and properties.

Air Pollution.

Addition of substances to air due to natural phenomenon like volcanic eruptions, storms, etc. and human activities like industrial development, mining, vehicles etc. changes the properties of pure air which has adverse effects on humans as well as other forms of life along with non-living objects like monuments, buildings etc. This is called air pollution and the substances responsible for it are called air pollutants.

(a) Sources of Air Pollution:

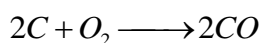


(C) Glaciers will shrink with increases in global temperature

(D) Increase in temperature affects climate, crops and human health.

Carbon dioxide and methane are called green house gases.

(ii) Carbon monoxide : Carbon monoxide is one of the most serious air pollutants. It is produced by incomplete combustion of fuel or carbon containing compounds.



The main source of CO is automobile exhaust; other sources are furnace, forest fires, natural gas, volcanoes, etc.

Some major ill effects of CO are given here –

(A) Like all gaseous pollutants CO mainly causes severe damage to the respiratory system.

(B) Various health hazards like headache, breathing problems, dizzying nausea, muscular weakness, heart and chest problems etc.

(C) If the gas is inhaled for 6 to 8 hours, it causes CO poisoning. The gas combines with hemoglobin of blood forming carboxy hemoglobin. This compound reduces oxygen carrying capacity of blood and ultimately leads to the death of the person.

(D) Tobacco smoke (from cigarette, bidi, cigar, etc) contains a large concentration of CO along with other pollutants. Tobacco smoking has ill effects on the health of the persons who smoke (active smoking) and also on the persons who do not smoke, but simply inhale tobacco smoke sitting nearby the smokers (passive smoking).

Tobacco smoke causes cancer of mouth, throat, lungs, kidney etc. it causes coronary heart disease and peripheral vascular diseases.

When a person is affected by CO exposure the first step is to take him or to fresh air immediately and not to allow him/her to talk. Then make him comfortable by loosening his/her clothes and shoes. Artificial respiration is given if breathing has stopped or it is irregular. The person is wrapped in a blanket to prevent chilling.

(iii) Sulphur dioxide emitted from heavy industries: Manufacture of sulphuric acid and fertilizers, petroleum refining plants, smelting industries, electric power plants, automobiles etc. account for the production of sulphur dioxide in large amount.

Effects on animals: As air pollutant, SO₂ causes irritation and affects eyes and respiratory tract. Lung cancer may be caused due to high level of SO₂ pollution. Other effects of SO₂ pollution include cough, obstruction in breathing, asthma etc.

Effects on plants: Sulphur dioxide also affects vegetation. It kills leaf tissues causing leaf necrosis. It also retards plant growth. Cotton, wheat, barley and apple are most sensitive to SO₂ pollution.

Apart from being injurious to animals and plants, SO₂ destroys other substances such as marble, limestone, paper textile material and buildings. SO₂ from Mathura refinery and other industries near Agra has affected the world famous Taj Mahal in Agra.

In areas of low temperature, SO₂ pollution causes smog (smoke + fog) which adversely affects all living beings.

(iv) Particulate Matter: Particles of small size, which are air borne are known as particulate matter.

(A) Sources of particulate matter:

- These tiny particles are produced by a large number of natural and human activities. Some of these are given here-
- Volcanic eruptions.
- Combustion of fuels such as coal, wood and oil.
- Industrial operations like mining, crushing, grinding, cutting and polishing of marble slabs and other minerals.
- Construction of buildings, roads, bridges, domestic houses etc.
- Thermal power plants which continuously emit huge amounts of fly ash.
- Textile industries emit fibrous matter in air.

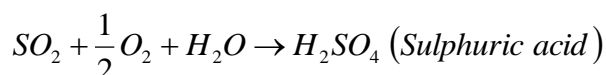
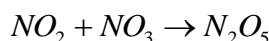
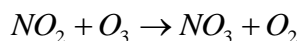
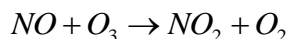
(B) Adverse effects of particulate matter:

- Particulate matter affects our lungs and may cause diseases like tuberculosis, lung cancer etc. Black lung disease is common among people working in coal mines.
- The disorders that are related to a person's occupation are called occupational disorders.

- Persons working as granite cutters, suffer from silicosis, a disease caused due to the deposition of silica in lungs.
- Persons working in asbestos mines and other related industries mostly suffer from mesothelioma, a type of cancer which is developed in the tissue lining of abdomen. They may also suffer from tuberculosis and lung cancer.
- Lead particles affect the development of red blood cells. Lead and asbestos act as cumulative poison and cause brain damage and cancer.
- Particulate matter inhibits the removal of toxic substances in the mucus flow and may cause bronchitis.
- Mercury, even in trace amount, causes nerve damage and death.
- Particulate matter such as dust, soot etc. deposited on plant leaves, block the stomata of plants. Thus retarding the absorption of CO_2 decreasing photosynthesis and thus reducing the growth of plants.
- Cadmium particles cause cardiovascular diseases and hypertension in human beings.

(C) Acid Rain.

Oxides of nitrogen and sulphur present in the atmosphere undergo some chemical changes and form acidic drop when associated with moisture of air. The chemical reactions are given here –

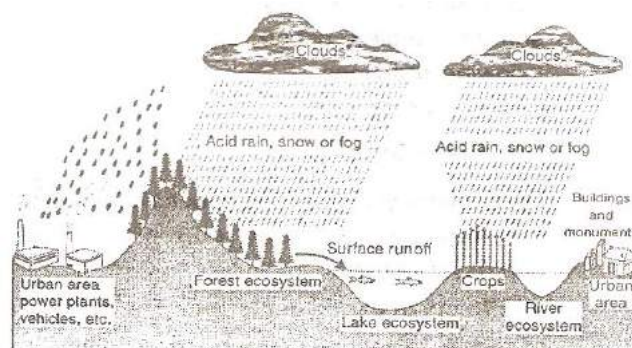


Thus acidic drops formed in the atmosphere come down the earth along with rain drops. This phenomenon is known as acid rain.

Acid rain has the following effect on environment:

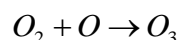
- It causes damage to buildings and structure made of marble, lime stone, slate etc. This corrosion of marble is termed as stone leprosy.
- Bridges become weak due to acid rain and they may collapse at any moment.
- Acid rain destroys the fishes and other living beings of ponds and lakes.
- Acid rain increases the acidity of soil, which affects the crops.

- Acid rain dissolves heavy metals like cadmium, zinc, copper, nickel etc. from minerals and carry them to water bodies causing water pollution.



(D) Atmosphere and Ozone Layer:

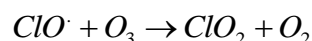
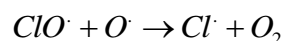
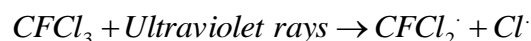
Ozone layer is present in the stratosphere of the atmosphere. It absorbs ultraviolet rays coming from the sun and saves living beings on earth from the ill effects of these radiations. When ultraviolet rays strike ozone molecules, these break up into two parts. These parts combine again to form ozone and heat is produced.



Thus the ozone layer stops ultraviolet rays from reaching the earth.

(i) Depletion of ozone layer: Depletion of the ozone layer is caused due to the following factors:

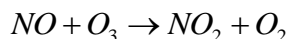
(A) Depletion by chloro fluoro carbons and other chemicals: Chloro-fluoro carbons (CFCl_3 , CF_2Cl_2 etc.) are used in refrigerators, air conditioners, foam manufacture, aerosols, etc. Chloro fluoro carbons deplete the ozone layer by the following mechanism:



In these reactions $\text{ClO}\cdot$, $\text{Cl}\cdot$, $\text{O}\cdot$, etc. are known as free radicals.

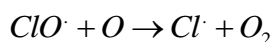
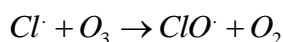
(B) Depletion by supersonic aircrafts:

Supersonic aircrafts fly at a height of 18000 to 20,000 meters and their engines produce nitric oxide at high temperature which on reaching the ozone layer, depletes it.



(C) Depletion due to nuclear explosions and volcanoes:

Nuclear explosions in air produce nitric oxide which deplete the ozone layer. Active volcanoes send chlorine and hydrogen chloride gases in the atmosphere. These form chlorine free radicals in the presence of ultraviolet rays and then deplete ozone layer as shown in the following reactions.



Ultraviolet radiations bring genetic changes, stop album information and reduce the rate of photosynthesis.

(ii) Effects of ozone depletion: The major effect of ozone depletion is Green House Effect.

(iii) Ways of saving ozone layer: Following steps may be taken to save ozone layer.

- Production and use of chloro-fluoro carbons should be completely stopped.
- Emission of oxides of nitrogen from industries should be controlled.
- Use of supersonic aircrafts should be controlled.

Importance of Trees.

Trees and plants are very useful for living beings and for our environment. The advantages of trees related to our environment are:

- (i) Trees produce life giving oxygen gas. In one year a fully developed tree produces approximately one thousand kilogram of oxygen.
- (ii) Trees absorb huge amount of carbon dioxide, thus reducing environmental pollution.
- (iii) Trees attract clouds, condense them to produce rain. They also reduce the effect of storms and fast winds. This helps in conserving soil.
- (iv) Trees control the flow of water. It causes more water to enter the soil, thereby increasing water level. Wells, lakes, springs receive this water.
- (v) Roots of trees, bushes and grass check soil erosion. This saves the fertile soil.
- (vi) Trees maintain the fertility of soil.
- (vii) Trees provide cool shadow due to emission of water through their leaves.

(viii) Trees provide shelter and food to animals and birds. This maintains bio-equilibrium in nature.

(ix) Trees play an important role in checking the growth of deserts.

(x) Trees are helpful in reducing sound pollution. Trees absorb sound waves and convert them into heat energy. Apart from this, trees provide a large number of materials for our economical development. Trees also provide beauty of nature.

Land Pollution.

Such changes in the physical, chemical or biological properties of land which reduce its utility or make it completely useless or which cause adverse effects on human beings and other animals, are known as land pollution:

Natural causes of land pollution include volcanoes, earthquakes, landslides, rain etc. man made activities responsible for land pollution include municipal waste, industrial waste, nuclear waste, excessive and uncontrolled mining, excessive use of fertilizers etc.

(a) Ill Effects of the Use of Polythene Bags and Possible Ways of Cure:

Some of the problems are as follows:

- (i) Polythene bags do not undergo biodegradation and remain permanently in soil. This inhibits the growth of plants.
- (ii) Polythene bags block drainage system and this creates a number of hygienic problems.
- (iii) People throw garbage packed polythene bags. Cows and other animals swallow garbage along with the polythene bags. Accumulation of these bags in animal's stomach becomes the cause of their ill health or their death.

In western countries, people have totally stopped the use of polythene bags. In place of these bags, paper or bags made of cloth may be used.

(b) Ecofriendly Ways of Waste Disposal:

- (i) Most urban solid wastes can be burnt to make land fills.
- (ii) Wastes like plastics, metals, etc, maybe recycled.
- (iii) Plastic wastes may be molten and mixed with asphalt to produce road making material.
- (iv) Many domestic wastes like vegetable refuse can be composted and effectively used as manure.

(v) incineration i.e, burning at a high temperature is recommended for many non reutilisable wastes.

(c) Soil Erosion:

Loss of fertile top layer of the soil by different agencies like wind, water etc is called soil erosion. Soil erosion is a continuous and world wide phenomenon and is as old as the soil it self.

(i) Types of soil erosion:

(A) Sheet erosion or Water erosion: Removal of top soil by water is called water erosion.

(B) Wind erosion: Wind erosion occurs on the dry and uncultivated land. Due to high temperature, the soil particles lose moisture due to evaporation, become loose and are blown away by wind.

It is because of wind erosion that the desert of Rajasthan is advancing eastwards in India.

(c) Main made erosion: Agricultural land is being urbanized by the formation of buildings, roads and other structures, it has decreased the seepage of water, increased the consumption of water the consumption of water thereby lowering the water table. In this ways, top layers of soil are becoming dry and prone to erosion. Over grazed pastures also become prone to erosion.

(ii) Causes of Soil erosion: Animals and human beings disturb the nature in many ways that leads to soil erosion.

Most common causes of soil erosion are:

(A) Deforestation:

(B) Uncontrolled over-grazing:

Erosion due to overgrazing by sheep and goats is very common over the hilly areas of Rajasthan, Madhya Pradesh, Himachal Pradesh and Kashmir.

(C) Shifting cultivation: The tribes living in the forest areas remain on the clear path only for 2-3 years and then shift to another patch. Since the land is cleared in a reckless manner by burning the vegetation and no steps are taken to protect the soil, intensive erosion and heavy floods result due to shifting cultivation.

(D) Unscientific methods of cultivation:

Misdirected tillage, artificial drainage, over cropping and lack of fertilizers followed by overgrazing are all responsible for the ravages of soil erosion.

(iii) Prevention of soil erosion (Soil Conservation): Prevention of soil erosion is called soil conservation.

Various measures being taken now – a- days for soil conservation are as follows:

(A) Protecting forests: For healthy soils, 50% of the total land should be covered by forests. In India only 28% of land area is under forests. Government has enacted various laws by the virtue of which trees cannot be cut, even in the private land.

(B) Afforestation: Massive afforestation i.e., planting more trees is being done. Every year in the month of August, 'Van Mahotsav' is celebrated and millions of trees are planted. For every tree which has to be cut, ten trees are planted.

(C) Strip farming: The field is divided into strips. Farming is done on alternate strips and in between, the surface is kept grassy. It keeps the fertility of soil intact. Next year the strips are exchanged.

(D) Crop rotation: A particular crop should be not be grown repeatedly in the same field. A three year rotation of crops keeps the soil healthy and less prone to erosion.

(E) River embankment: Rivers should be protected by pucca bank so as to avoid breaks and control floods.

(F) Dams: Violent rives should be tamed by building dams to store water. This is used for generating electricity and controlled irrigation.

(G) Pastures: Grazing in pastures has been controlled.

(H) Wind breaks: Special wind resistant plants are planted along the path of hot winds. They are called wind breaks, e.g., Ber, Kaner, Calotropis, Castor, Shisam, have been effectively used as wind breaks to stop the desert of Rajasthan from advancing eastwards.

(I) Organic Manure: Compost and farmyard manure are extensively used. It adds the organic matter to the soil which holds moisture and prevent soil erosion.

Sound Pollution

The uncomfortable sound is called noise, which is responsible for sound pollution.

(a) Measurement of Sound Pollution:

Sound pollution is measured from the intensity of sound. The unit for measuring the intensity of sound is decibel (dB.)

Decibel has been named after the name of famous scientist A. Graham Bell.

(b) Intensity of Sound Produced from Different Sources:

S.No.	Source of sound	Intensity of sound (dB)
1	Breathing	10
2	Ticking of a wrist watch	20
3	Normal conversation	35-60
4	Noise of employees in office	60-80
5	A truck passing on the road (approx 50 feet)	90
6	Shouting	100
7	Noise of motorbike	105
8	Noise of a siren	150-160

(c) Effects of Sound Pollution:

A man can tolerate a sound intensity of 80 dB without any discomforts.

(i) **Audiological Effects:** Sound pollution of 90 dB produces constant resonating sound in ears. A sound of very high intensity and close to the ear may damage the eardrum and the person becomes permanently deaf.

(ii) **Physiological Effects:** Sound pollution affects our eye sight, heart, respiratory system, liver and mind. Sound pollution produces headache and irritation in skin, vomiting, giddiness etc.

(iii) **Psychological Effects:** Sound pollution produces psychological effects on living beings which change their acts and behaviour. Their behaviour becomes irritating and they feel mentally tensed.

(iv) **Other Effects:** Sound pollution disturbs conversation or lectures. It may also disturb classroom teaching. Sound pollution may disturb our sleep and this in turn will affect our normal health. In banks and offices, sound pollution reduces the working capacities of the employees. Sound pollution also affects animals and birds. Birds leave noisy places and build their nests at

peaceful place. Noise makes the animals dull and irritating.



Some common sources of noise pollution

A summary of effect of noise pollution on human health:

Sl. No.	Intensity of sound (dB)	Effects on human health.
1	80	Irritation
2	90	Listening ability reduces
3	95	Excessive irritation and excitation
4	110	Stimulation/excitation of skin
5	120	Painful feeling
6	130-135	Nauseas and vomiting
7	140	Pain in ears, chances of mental imbalance on prolonged exposure to noise pollution
8	150	Burning sensation in skin
9	160	Rupturing of ear drum
10	180-190	Damage to ears and other body parts in a short time.

Radioactive pollution

Neutrons released during nuclear tests make other materials radioactive in the surroundings. These materials include ^{90}Sr , ^{137}Cs and ^{131}I . The radioactive materials are converted into gases. These gases and fine particles are thrown high up into the air and carried away by wind to distant areas. They ultimately settle by wind to distant areas. They ultimately settle down and cause pollution to water and soil. From soil the radioactive substances enter the food chain and thus affect all forms of life including man. Cosmic radiations and explosion of a hydrogen bomb produce ^{14}C in air.

Nuclear power plant and reprocessing plants discharge ^{90}Sr , ^{137}Cs , ^{131}I , ^{140}Ba , ^{140}La , ^{144}Rh , etc. Coal based thermal power stations released radioactive gases such as ^{85}Kr , ^{133}Xe and

particulates such as ^{137}I , ^{60}Co , ^{54}Mn and ^{137}Cs through chimney.

Nuclear dumping within land or in oceans leads to radiation pollution.

(a) Effects of Radioactive Pollution:

(i) Radiations induce mutations and breaks in chromosomes, particularly at the time of cell division.

(ii) Higher doses or radiations can cause cancer, leukaemia, anaemia and sterility. Excessive use X-rays causes death of tissues.

(iii) Radiations induce mutations in plants also causing morphological deformities.

(b) Control of Radiation Pollution:

(i) Manufacture and use of nuclear weapons should be stopped.

(ii) Nuclear tests and further development should be suspended.

(iii) Ocean dumping of nuclear wastes should be suspended.

(iv) Proper handling of radioisotopes during their use in various fields should be done.

Steps towards Environment Protection

(i) Judicious use of fertilizers and pesticides.

(ii) Composting solid waste and setting up of more biogas plants.

(iii) Setting up of national park and national sanctuaries to ensure safeguard of wildlife.

(iv) Rain water harvesting in urban areas.

(v) Increase in greenery and covered areas by planting more trees.

(vi) Strict imposition of emission norms for vehicular traffic. More use of CNG vehicles.

(vii) Rapid action plan for cleansing of water bodies like Yamuna for bringing back the natural balance between the biotic and the abiotic factors affecting the river.

(viii) Setting up of proper garbage collecting enclosures and public lavatories with regular and hygienic disposal methods.

(ix) Launching of massive awareness programmes to show that human survival is the logical outcome of nature's maintenance.

(x) Activation of citizen forums for voluntary undertaking of the above mentioned steps.

EXERCISE

1. Fluoride pollution mainly affects-
(A) teeth (B) heart
(C) brain (D) kidney

2. In 1984, the Bhopal gas tragedy took place because methyl isocyanate-
(A) reached with water
(B) reached with DDT

(C) reached with ammonia

(D) reached with CO_2

3. Maximum permissible limit of noise as per the noise pollution rules 2000 of India is-
(A) 75 decibel (B) 65 decibel
(C) 55 decibel (D) 50 decibel
4. Silicosis is caused by -
(A) acid rain.
(B) depletion of ozone
(C) inhalation of aerosols.
(D) inhalation of sulphur dioxide.
5. Sterility is caused by which pollutant in water?
(A) Copper (B) Mercury
(C) Cadmium (D) Manganese
6. The pH of acid rain water is-
(A) 1.2 (B) 3.1
(C) 5 (D) 6
7. Byssinosis is a disease caused by -
(A) fly ash (B) cement dust
(C) cotton fibres (D) lead particles
8. Major source of methane in India is -
(A) fruit orchards
(B) sugarcane plantations
(C) rice fields
(D) wheat fields
9. Which element is believed to be responsible for the fall of the Roman Empire?
(A) Copper (B) Lead
(C) Arsenic (D) Zinc
10. Supersonic jets cause pollution by thinning of -
(A) CO_2 layer (B) SO_2 layer
(C) O_2 layer (D) O_3 layer
11. Cracking or rubber is caused due to-
(A) acid rain (B) soot
(C) smog (D) All of these
12. Sulphur dioxide affects -
(A) cell wall (B) brain
(C) skin (D) membrane system
13. Ultraviolet radiations from sunlight causes a reaction that produces-
(A) fluorides (B) carbon monoxide
(C) sulphur dioxide (D) ozone
14. DDT is a -
(A) greenhouse gas
(B) degradable pollutant

- (C) non degradable pollutant
(D) None of these
15. News paper contains a toxic material called -
(A) cadmium (B) lead
(B) manganese (D) mercury
16. Most atmospheric pollutants do not rise above -
(A) 6000 m (B) 600 m
(C) 60 km (D) 6m
17. Jet aeoplanes release the pollutant in air called -
(A) smog
(B) photochemical oxidants
(C) aerosols
(D) fly ash
18. Non-ionising radiations with specific biological effects are -
(A) UV radiations (B) beta rays
(C) gama rays (C) X-rays
19. Which of the following pollutants is not harmful to the lungs?
(A) CO (B)SO₂
(C) CO₂ (D) NO₂
20. Which of the following vbehicular is currently accepted as ecofrindely?
(A) Diesel (B) Petrol
(C) LPG (D) CNG
21. Rama was asked to list cause of air pollution. She prepared the following list.
- (NTSE-Steps-1/ Raj/2007)
(a) Burning of coal
(b) Burning of liquefied petroleum gas.
(c) Burning of compressed natural gas
(d) Occurrence of ozone gas at low altitudes
Choose the correct answer
(A) a only
(B) b and c only
(C) a,b and d only
(D) all of the above
22. The correct mass percentage of hydrogen in water is (NTSE-Steps-1/ Raj/2007)
(A) 11.11 (B) 22.22
(C) 33.33 (D) 66.66
23. Leather industry causes pollution because it discharge one or more of following- (NTSE-Steps-1/ Raj/2007)
(a) Greasy water
(b) sulfide waste
(c) volatile organic compounds
(d) chromium
Choose the correct answer
(A) a only (B) b and c only
(C) a,b and d only (D) all the above
24. Carbon mono oxide is hazardous gas. Inhaling this gas which of the following is affected?
(NTSE-Steps-1/ Raj/2008)
(A) haemoglobin (B) plasma
(C) cell membrane (D) plastids

ANSWER – KEY

POLLUTION

Q.	1	2	3	4	5	6	7	8	9	10
A.	A	A	A	C	D	B	C	C	B	D
Q.	11	12	13	14	15	16	17	18	19	20
A.	C	D	D	C	B	B	C	A	C	D
Q.	21	22	23	24						
A.	A	A	D	A						