

Pollution

Pollution is the release into the environment of chemicals or substance or energy, through man's activities, in such quantities and for such duration, that may cause harm to man or his environment or resources. In other words, pollution is the release of harmful substances into the environment which could be water, air and land in quantities or to the level that are harmful to man, plants and animals the harmful substances that cause pollution are called **pollutants**.

Types of Pollution

1. Pollution of the atmosphere - i. Air pollution ii. Noise Pollution
2. Land pollution.
3. Water pollution.

Pollution of the Atmosphere

Air pollutant	Sources	Effects
Carbon monoxide	Burning of fuels in cars, other combustion of engines and some industrial processes.	It causes suffocation because it combines with haemoglobin and reduces its ability to carry oxygen which results in death.
Sulphur dioxide	Burning from vehicle exhaust, coal mining and cement factory	[i] it causes impaired health such as the irritation of eye, lungs and skin, cough and other respiratory tract diseases. [ii] it can cause acid rain.
Nitrogen oxides	Electrical and discharge in air and industrial processes.	[i] it forms nitric acid with water in air to form acid rain which corrodes metallic objects. [ii] it irritates the skin and respiratory system.
Smoke and soot	Burning of substances from industries, machines and coal into the air.	[i] particles can damage lungs and cause discomfort. [ii] soot can cover the leaves of plants thereby reducing photosynthesis [iii] smoke reduces visibility. [iv] it blackens paint on buildings.
Dust particles	Mining, quarries, machines and industrial processes	(i) It irritates respiratory system and cause respiratory issues like catarrh and cough (ii) It reduces visibility (iii) Pollen grains containing dust can affect the lungs resulting in asthma.
Radio-active	Industrial processes such as electric plants that use radio-active substances	It can destroy or alter genes.
Noise Pollution	Source	Effects
	-Factory or industrial noise -Aeroplane or Aviation noise -Railway engine or locomotive noise. -High pitched musical sounds from loud speakers -Car horns and sirens	- It cause loss of hearing - It can lead to emotional disorder - It can cause headache - Loud noise makes people uncomfortable and can also result into loss of sleep.

	-Noise from heavy guns or cannon shots - Noise from thunder Noise from generators	
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Control of Air Pollution

1. Chemical wastes should be discharged into the air through fumes chambers.
2. Industries should be sited far away from residential areas.
3. Provisions must be made for complete combustion of fuel in internal combustion engines.
4. Legislation should be made against indiscriminate burning that may bring about smoke.

Control of Noise Pollution

1. Control source of noise if you can.
2. Use of personal protection to reduce effects of noise e. g use of ear-muffs by factory, airport and quarry workers.
3. Legislation should be made against the use of loud speakers in public places.

LAND POLLUTION

This includes soil pollutants and vegetation pollutants

Soil pollutants are refuse, sewage, metal scraps, glass, plastics and mining wastes.

Vegetation pollutants include- pesticides, waste products from exhaust fumes from vehicles, and chemical effluents from factories.

Some land pollutants, their sources and effects are stated in the table below:

Land Pollutants	Sources	Effects
1. Refuse e.g. Paper	Homes, Offices, Markets and Factories.	Occupy much space, may be unsightly, some item may decay and cause offensive odour.
2. Sewage	Homes and offices	-Gases given off as hydrogen sulphide may have offensive smell - It may contain some disease-causing organisms which can be washed by water into sources of drinking water or carried by air into human food.
3. Metal scraps and bodies of old vehicles	Disused vehicles and machines	- Occupy land space - Obstruct land use for farming and other purposes
4. Glass	Glass manufacturing and bottle-using companies.	- Can cut human skin or body. - It does not decay and renders soil risky to use for a long time.
5. Plastics	Plastic industries, homes	- Does not decay but occupies land space. - It may collect water and serve as a breeding place for

		mosquitoes.
6. Chemicals such as Lead, Zinc and Cadmium Compounds	Chemical wastes from paints, lead accumulators, galvanizing industries.	<ul style="list-style-type: none"> - May be poisonous to man e.g. Lead, Cadmium, Zinc etc. - Plants may absorb them from soil, causing ill-health to humans who feed on such plants.
7. Pesticides	Pesticides sprayed on crops	<ul style="list-style-type: none"> - May kill useful insects - May be washed by surface floods into rivers and streams, polluting the water.
8. Mining	Mines (e .g. Iron ore, Lead Zinc mines)	<ul style="list-style-type: none"> - Occupy Much land space - It may contain poisonous chemicals - Winds may raise dusts from mining wastes and the dusts may pollute the environment.

Control of Land Pollution

1. Refuse should be burnt in proper incinerators
2. Metal scraps, tin cans, bottles, motor vehicle parts should be compressed into very small compact objects for easy disposal.
3. Plastics should be recycled or burnt in proper incinerators for the control of poisonous fumes.
4. Pesticides should be applied in the correct form and amount.

WATER POLLUTION

Water Pollutant	Sources	Effects
1. Crude Oil	Explosion of oil rigs, leaking of pipelines, tankers and tanks. Spilling during loading and off-loading of tankers and tanks	<ul style="list-style-type: none"> - Crude oil is toxic to plants and animals. - It soaks feathers of water birds making them unable to fly - It covers the surface of water and prevents oxygen from dissolving in the water hence leading to the death of aquatic organisms.
2. Fertilizers	Fertilizers applied to farms are washed by surface floods into streams, rivers, lakes and oceans.	<ul style="list-style-type: none"> - Makes water unfit for drinking. - Nitrates and phosphates in water cause nutrient enrichment in water which in turn causes rapid growth of algae and water plants. - The undue growth of water

		<p>plants may block water ways, eventually the water plants begins to die and decay. Putrefying bacteria multiply rapidly and their respiration depletes the oxygen concentration in the water.</p> <ul style="list-style-type: none"> - This leads to the death of aquatic organisms.
3. Untreated sewage	Human faeces , and urine from homes and public buildings may be discharged directly into streams, rivers, lakes and oceans.	<ul style="list-style-type: none"> - Untreated sewage makes water unfit for drinking - Sewage may contain organisms that cause diseases such as cholera, typhoid fever, dysentery, infective hepatitis, diarrhea. - It may stimulate undue growth of water plants.
4. Detergents	Industries that manufacture detergents or use them to wash bottles (e .g .breweries).	<ul style="list-style-type: none"> - Detergents make water unfit for drinking. - They are toxic to fish and other aquatic animals - Phosphates in some detergents may cause undue growth of water plants.
5. Organic Matter	Organic matter may be washed from farms or forests into water. It may be thrown into water due to wrong method of disposal .g. chicken droppings or refuse from markets.	<ul style="list-style-type: none"> - Organic matters make water unfit for domestic use. - It encourages excess growth of water plants
6. Herbicides, Insecticides and Fungicides	Pesticides sprayed in farms, homes or drains may be washed by surface flood into water bodies.	<ul style="list-style-type: none"> - Contaminate drinking water. - They are poisonous to fish, livestock and man
7. Cyanides	May be present in industrial wastes, chemicals discharged into bodies of water. Present in cassava stocked by some farmers in pond areas and it slowly flows into the water bodies.	<ul style="list-style-type: none"> - Cyanides are toxic to man and other living organisms.
8. Lead Compounds	May be present in exhaust	<ul style="list-style-type: none"> - Lead compounds are toxic

	fumes of vehicles because in some countries, a lead compound is added to petrol to prevent engine knock. Maybe present in industrial chemical wastes such as those of paint and lead accumulator industries.	<p>to man, aquatic plants and animals.</p> <ul style="list-style-type: none"> - They accumulate in organisms along food chains i.e. the concentration increases from one trophic level to the next..
9. Mercury Compounds	May be present in chemical wastes from industries that use mercury.	<ul style="list-style-type: none"> - Very toxic to man and aquatic plants and animals - Even little concentration in water accumulates along food chains.
10. Copper	May be present in chemical wastes of industries that use copper compounds.	<ul style="list-style-type: none"> - Very toxic to man, livestock and crops. - Concentration builds up from one trophic level to another in food chains.

Control of Water Pollution

- Sewage, industrial wastes etc. should be treated before emptying the effluent into water bodies.
- Use of organic manure instead of inorganic fertilizer should be encouraged among farmers.
- Oil spillage should be avoided.
- Radioactive wastes should be stored in nuclear waste silos in order to avoid contamination of ground water by radioactive materials.