



216en06



Notes

ENVIRONMENT

You must have noticed over the years that the places where there used to be trees, farms, water bodies, now there are bungalows, houses, industries and multiplexes. Trees are being cut to construct houses. The number of vehicles on road has increased. If you look around, you can see smoke and dust in air and these are increasing day by day. Apart from this, you must have smelt the peculiar foul odour from rotting garbage, high level of noise from vehicular traffic especially in cities. In small towns and villages too, the environment has degraded due to increase in number of vehicles and unsafe disposal of waste. Do you know all these cause a lot of health problems. How are you affected by them and can you do something about it? Yes you can, it is only a matter of thinking creatively and suggesting ideas to solve this problem. In this lesson let us try to find answers to these and many more similar questions.



Fig 6.1: After effects of pollution



OBJECTIVES

After reading this lesson you will be able to :

- define the terms pollution and pollutant;
- categorize pollution into different types based on its sources;



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- state the effect of pollution on environment and health;
- suggest measures for controlling different types of pollution;
- understand the process of waste disposal and adopt an eco friendly waste disposal plan.

6.1 WHAT IS POLLUTION?

Pollution is the addition of any substance to the environment in excess to what is normally present, thereby, making the environment impure. River water gets polluted and become unsafe for human consumption. Air gets polluted due to smoke and fumes. All these make it difficult for us to breathe. You know that smoke is emitted by automobiles, factories and the chullahs. The atmosphere and the soil also get polluted due to industrial, human and animal waste. In addition to these, noise pollutes the atmosphere.

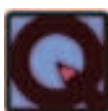
The term ‘pollution’ is derived from the Latin word ‘Polluere’, which means ‘to contaminate any feature of the environment’.

What are Pollutants?

The substances which cause pollution are known as **pollutants**. It may also be defined as a constituent in the wrong amount, at a wrong place or at a wrong time. A pollutant is harmful to our health. When you wash clothes or bathe in the river, the dirt and soap are released into water and cause pollution. They make the water dirty or unsafe for drinking. Can you give some more examples of pollutants? Yes, you are right, dust, dirt, garbage, chemicals and industrial wastes are a few examples of pollutants. Can you tell how do they pollute?

These pollutants affect air, water and soil and therefore the pollution is categorized into:

- air pollution
- water pollution
- soil pollution
- noise pollution.



INTEXT QUESTIONS 6.1

What type of pollution is caused by the following? Tick (✓) the correct option(s). You may tick more than one option wherever required.

- | | |
|--------------|------------------------|
| i) vehicles | air/ water/ soil/noise |
| ii) industry | air/ water/ soil/noise |

- | | |
|-----------------------------|-------------------------|
| iii) dust and dirt | air/ water/ soil /noise |
| iv) chemical wastes | air/ water/ soil /noise |
| v) washing clothes in river | air/ water/ soil /noise |
| vi) garbage on road side | air/ water/ soil /noise |

6.2 AIR POLLUTION

Simran was suffering from chronic cold and cough for the last one year. She had breathing problem. The doctor diagnosed that she has bronchial asthma due to smoke and dust. Simran was allergic to smoke and dust. She was living in a rented house in a congested industrial locality, doctor advised her to shift to a cleaner and pollution free environment. As she changed her living environment her health improved.

We know that oxygen is the most important component of air. All living beings are dependent on it for life.

Human beings and animals breathe in oxygen and breathe out carbon di-oxide. During the day, plants take in this carbon-di-oxide and give out oxygen.

This helps in maintaining a balance in the composition of oxygen and carbon-dioxide in the air. If things remain this way there is no problem. Most of the time, especially in and around cities, the air that we breath in contains various pollutants.



Fig 6.2: Oxygen Cycle

6.2.1 Sources of Air Pollution

Various activities are worth examining because these are major causes of air pollution. The process of combustion causes smoke which may come from burning of household fuel, burning of coal in thermal power stations, exhaust from automobiles, bursting of crackers, smoke from factories, spraying of insecticides and pesticides through airplanes spreads the poisonous substance in a large area of the atmosphere. Use of solvents and spray paints also pollute environment. All these sources produce so much smoke that it is difficult to breathe. Smoke also affects our eyes and causes blindness.

Now, don't you think that human beings are the main culprits in causing pollution. Besides human beings there are some natural sources of pollution too. We don't have control over these pollutants. These include gases emitted from volcanoes, gases produced during forest fires and dust which spreads with the wind.

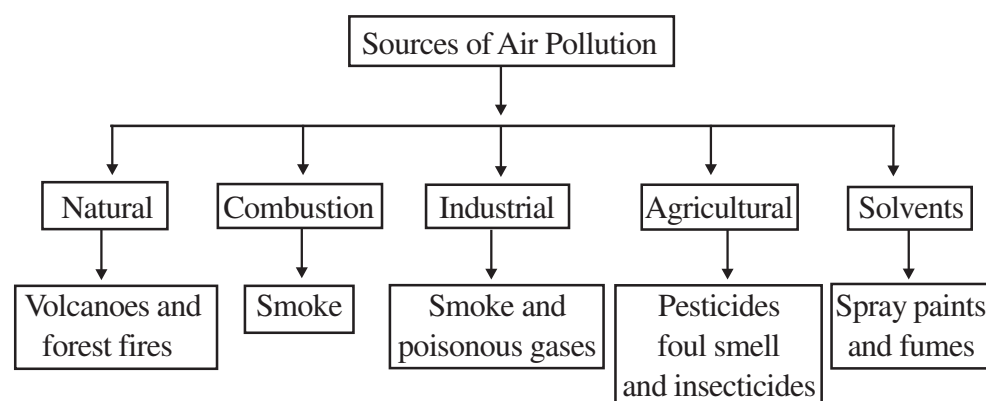


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To sum up we can say:



6.2.2 Effects of Air Pollution

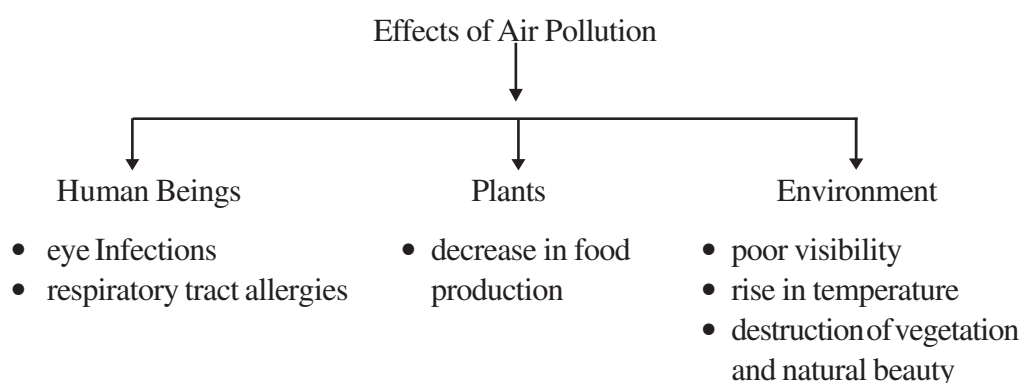
Let us now see some of the effects of air pollution.

Due to pollution, the plants get less sun light thereby affecting their food manufacturing process. This also blocks the pores of leaves and restricts plant respiration process.

You have already read that pollution affects the respiratory system of human beings. It leads to diseases like bronchitis and asthma. Certain types of skin and eyes allergies like rashes and redness are also common.

Pollution affects the environment in a dreadful manner. You must have heard that sometimes serious accidents are caused due to poor visibility due to fog also due to the presence of pollutants like smoke and dust in the air (this is called smog).

During gulf war in 1990-91, the smoke produced by burning of oil fields led to a rise in temperature of surrounding areas that in turn destroyed vegetation and spoilt the natural beauty of the surrounding regions.





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6.2.3 Ways to control air pollution

Think of the ways to control air pollution. You can do it through the following:

- i. Use a smokeless chulha at home. Provide a tall chimney to the chulha to carry the smoke away.
- ii. Use biogas which is a smokeless fuel.
- iii. Use a solar cooker at home which uses heat from the sunlight.
- iv. Factories should have chimney filters. This will help in trapping the poisonous substances in the gases that are let out by the factories.
- v. Factories emitting smoke must be located far away from the residential areas.
- vi. Vehicles must be fitted with special devices to reduce air pollution.
- vii. Use unleaded petrol and CNG (Compact Natural Gas) for private and public transport.
- viii. Garbage should not be burnt. It should be disposed of hygienically, preferably through sanitary landfills.
- ix. Roads must be pucca so that dust does not rise and mix with air.
- x. Trees should be planted and cared for, so that these keep the air fresh and pure.
- xi. Crops should be grown in the fields all the year round so that the soil is not exposed to erosion.



ACTIVITY 6.1

Visit your neighbourhood and note the measures adopted in the households and factories to control air pollution. Suggest some changes to control air pollution.

INTEXT QUESTIONS 6.2

1. State which of the following statements are True or False. Also correct the false statements.
 - i) Wind decreases the amount of dust particles in the air.

 - ii) Tall chimneys fitted with filters help to reduce air pollution.

 - iii) Location of factories near residential areas reduces air pollution in cities.



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iv) Adding a tall chimney to the chulha decreases air pollution.

2. Unscramble the given alphabets to identify sources of air pollution.

i) TRIULAUGRCAL _____

ii) ESNLOSTV _____

iii) SRILADNUIT _____

iii) BTNOMOICUS _____

3. Suggest measures to control air pollution caused by the following pollutants:

Smoke _____

Poisonous gases _____

6.3 WATER POLLUTION

Many of us receive safe water for drinking from taps. It is sent to your houses after cleaning by the municipal authorities. It is also treated to kill the germs. Can you list the characteristics of this water? It is water which has no taste, smell, colour, dirt or germs. Therefore it is called safe water and is suitable for drinking.

Polluted water may be coloured, may have suspended particles, a foul smell and a bad taste.

Do you know that all water is not safe for drinking or even for performing other chores in the houses. Unfiltered water from a tap in a public park is muddy and smelly. Sometimes it also has solid particles. Water from well/hand pump/pond/river may also have some or all of these characteristics. You would not like to use this water for drinking, cooking or even for washing your clothes and utensils. This water is polluted.

6.3.1 Sources of Water Pollution

Water gets polluted when the following are thrown in.

- i) **Domestic wastes:** Domestic waste is generated through various household activities. It causes pollution when it is disposed of in a nearby water source (river, lake or pond). Sources of water also get polluted when they are used for bathing animals, washing clothes and washing self after defecation. Very often garbage is also disposed of in this source of water. All these cause water pollution.
- ii) **Industrial wastes:** Waste material that comes from factories contains many harmful and toxic substances. It flows into the rivers, ponds, and seas and causes water pollution.



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- iii) **Agricultural wastes:** Chemical fertilizers and pesticides are used in the agricultural farms. In case of rainfall, the runoffs from these agricultural fields gets mixed with water causing the water to pollute, which in turn pollutes the water sources such as rivers, streams and lakes.
- iv) **Oil spills:** Some times oil from oil tankers spills over large areas of a sea. This also causes water pollution. It affects the plant and animal life present in water.

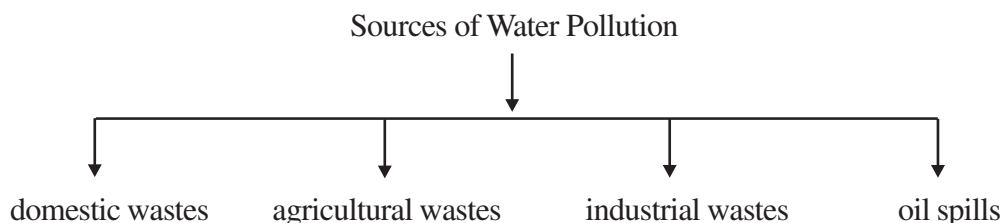


Fig 6.3: Water Pollutants

6.3.2 Effects of Water Pollution

Who gets affected by polluted water? Yes, all those who consume this water, i.e., human beings, animals and plants. You must have read in the newspaper, particularly in rainy season that in a particular locality, a large number of people have suffered from cholera or gastroenteritis. Often it is reported that the major cause of such epidemics is non-availability of clean water in that area. Drinking unsafe water causes diseases like cholera, typhoid, diarrhea and dysentery. Bathing in polluted water causes skin diseases and allergies.

Plants and animals such as fish, sea weeds and sea plants also get affected by polluted water. Do you know why? This is because pollution in water causes lesser availability of oxygen to them. They die because they cannot breathe without oxygen.



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6.3.3 Ways to control water pollution

Can you suggest some remedies to prevent water pollution? Look at the following list.

- i. Make sure that untreated sewage water is not thrown into the sources of water.
- ii. Industries should not be allowed to throw untreated wastes into the river or pond.
- iii. Defecation in open and near the water source should be discouraged. Use latrines for defecation.
- iv. Latrines, soakage pits, dumping grounds and land fills should be far away from sources of water.
- v. Bathing, washing clothes or bathing animals in or near the harvested water sources should be banned. Rain water in special ponds or wells should be used for washing clothes and bathing animals.
- vi. Rivers and seas should not be used for disposal of garbage.
- vii. If you are using a well or a pond as your source of water, see that it has a concrete wall or parapet and proper pucca or firm flooring around it.
- viii. Water should be stored in clean containers which are kept covered. Use a ladle with a long handle to take water out from its container. Never dip your hand in the water.



ACTIVITY 6.2

Make a survey of ten houses to list the ways of storing drinking water or making water safe for drinking. Classify them into the correct and incorrect ways.



INTEXT QUESTIONS 6.3

1. Tick (✓) mark the correct option:
 - (i) Water is safe for human consumption only when it is free of
 - a. floating substances
 - b. unwanted smells
 - c. micro organisms
 - d. all the above.



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- (ii) Domestic waste causes water pollution by discharging
 - a. waste water through soil to underground
 - b. waste water from toilets, bathrooms, kitchens etc. into water sources such as river, lake and pond etc.
 - c. waste water from factories and power plants etc.
- (iii) Washing clothes near a water source is harmful because the dirt and soap released
 - a. flow into the water
 - b. are absorbed by the soil to reach sub-soil water
 - c. are left behind to create slush
 - d. are responsible for doing all the above.

2. How do oil spills in water bodies affect the plant and animal life present in them?

6.4 SOIL POLLUTION

Soil pollution can be defined as change in the physical, chemical and biological nature of soil to the extent that it has a harmful effect on humans beings and other living beings. Soil becomes polluted when wastes from factories in the form of chemicals and metals are not disposed off properly. Some chemicals can make the soil totally infertile.

If insecticides, pesticides and fertilizers are added in excess, then they penetrate into the plants or fruits and vegetables growing near by. These chemicals then enter our digestive system and make us sick.

Last week Ramesh's son fell sick with stomach disorder. The doctor told him that it was due to his moving barefoot on the soil. When the garbage is left on the soil, it rots and becomes a breeding ground for insects, worms and germs. There may be disease germs already present in the garbage. When people defecate and urinate on the soil then dirt, germs and worms are generated. When somebody walks barefoot on this soil these germs and worms enter their system and cause stomach disorders. They enter into animal and plant systems also through food chain, thus infesting all living beings.

You must have observed that defecating and urinating in the open is a common practice in India. The urine and excreta may contain germs and worms which enter the soil and pollute it. If it rains, the dirt flows into the nearby source of water. Some people have a bad habit of spitting anywhere and everywhere. The sputum not only spoils the surroundings but may carry disease germs. It may dry up and disappear but the germs remain and pollute the soil.



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6.4.1 Effects of Soil Pollution

You have read that improper disposal of domestic waste, defecating, urinating and spitting in the open are all sources of spread of disease germs and worms into the soil. You also know that when we walk barefoot on the soil these germs enter into our body and eventually make us sick. Very often industrial and agricultural wastes leave harmful chemicals in the soil. Plants and vegetables grown in such soil absorb these chemicals. Animals and human beings who consume these plants may fall ill.

6.4.2 Ways to control soil pollution

Let us learn about some of measures which can help us to control soil pollution:

Proper disposal of garbage: Garbage from homes should be properly disposed of so that it does not allow flies, mosquitoes and cockroaches to breed. At home, it must be collected in a bin which should be kept covered.

- a) **Dump outside the city limits:** If dumping of domestic waste is done in pits which are covered with twigs and plants, the flies and mosquitoes cannot breed on it. After the pit is full, cover it with soil and let the garbage be buried.
- b) **Land fills:** Quite often, especially in big cities, the garbage collected is so much in quantity that small pits are no answer. Low lying areas outside the city limits and away from the source of water are selected and garbage is dumped there every day. Biodegradable material can be recycled. It produces foul smells and attracts birds, animals and insects. But since it is outside the city, it does not affect the people very much except when they pass the ugly site, they get the foul smell.
- c) **Composting:** The garbage from gardens is put into a pit in one corner of the garden. At the end of each day, it is covered with ash and leaves. Gradually the lower layers are converted into compost or manure. This manure can be used for gardening.
- d) **Burning of refuse:** You must have seen gardeners burning leaves and grass which they have removed from gardens. Burning can produce a lot of smoke which causes air pollution. Burning of refuse is banned in metropolitan cities since they already have very high level of air pollution.
- e) **Incineration:** The latest technology in garbage disposal is the use of an incinerator. An incinerator is a furnace in which the garbage is burnt. This is an expensive method because a lot of fuel is required to burn the rubbish. However, it is sterile and safe. The garbage is reduced to a relatively small heap of ash.

None of the methods of garbage disposal mentioned above is satisfactory. Each one has its own merits and demerits. But a lot can be achieved by keeping our surroundings clean if we educate ourselves and our neighbourhood about the proper disposal of garbage from our homes.

Some other measures to control soil pollution are:

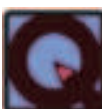
- Use of sanitary latrines.
- Limited use of insecticides and fertilizers.
- Use of environment-friendly products.

You will study about the Eco-mark later. This mark is put on goods that are environment friendly. You must prefer to buy such goods.



ACTIVITY 6.3

Visit your neighbourhood and observe the sources which are polluting the soil in your area. Suggest some measures to reduce this soil pollution.



INTEXT QUESTIONS 6.4

1. Write two measures to control soil pollution.
2. List three methods of garbage disposal that you have seen or practiced.
3. Tick (✓) the correct answer:-
 - i) This is the latest technology in garbage disposal
 - a. Composting
 - b. Burning
 - c. Incineration
 - d. none of these
 - ii) Harmful chemicals are left in the soil by
 - a. Domestic waste
 - b. Defecation
 - c. Industrial and agricultural wastes
 - d. Spitting
4. Match the following

A	B
i) Composting	a. It becomes polluted when waste from factories is thrown on it.
ii) Spitting	b. Can be used as manure for gardening
iii) Soil	c. It may dry up and disappear but germs remain and pollute the soil.
	d. It is banned in the metropolitan cities.



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6.5 NOISE POLLUTION

You enjoy listening to music and chit-chat with friends but the running of machines, the roar of loudspeakers and moving traffic make sounds which are loud and unpleasant. Some sounds are pleasant while others are not. Any unpleasant sound is called **noise**.

6.5.1 Sources of noise pollution

Look around yourself and identify the sources of noise pollution. Some of them may be

- i) automobiles, trains and airplanes
- ii) loudspeakers, radios and televisions when played at full volume
- iii) Industries and machines



Fig 6.4: Sources of Noise Pollution

6.5.2 Effects

What happens when you hear loud noises for a long period of time? They tend to disturb us, strain our nerves, cause headache and mental disturbance. They can also affect the hearing ability of an individual. You must have noticed that quite often factory workers, pilots and drivers who are exposed to very loud noise over a long period of time, gradually lose the ability to hear soft sounds properly. They become hard of hearing, their ear drums get damaged, sometimes leading to deafness. Exposure to noise pollution can also cause stress and mental instability.

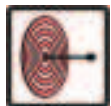
6.5.3 Ways to control noise pollution

It is impossible to get rid of all noises completely, but we can definitely reduce them. Following are some of the suggestions for reducing noise pollution:

- Playing radio's and TV's at low volume.
- Avoiding the use of loudspeakers.
- Talking in low tones.
- Using your vehicle horns only when it is necessary.
- Getting silencers fitted in the engine of vehicles.
- Building factories away from residential areas.
- Building airports far away from city limits.

**ACTIVITY 6.4**

Stand at the gate of your house, close your eyes and listen to the various sounds produced in your environment. List down the pleasant and the unpleasant sounds. Suggest some ways to reduce sounds that you would call noise.

**WHAT YOU HAVE LEARNT?**

You have learnt about different types of pollution and their harmful effect on all living beings. You have also learnt about some measures to control different types of pollution. After reading the information, we can say that controlling pollution is almost completely in our hands. We have to reduce the production of smoke by using fuels that are smoke free, by keeping our vehicles in perfect order so that they do not emit smoke, by putting tall chimneys in the factory for smoke to go out in the sky and so on. These little efforts of ours will save people from going blind and suffering from diseases of respiratory tract. It is for us to see that we can reduce noise pollution to a minimum and thus save people from becoming deaf or mentally unstable. We alone can enforce stringent laws to avoid water pollution and thus save people from suffering from diarrhoea, dehydration and hepatitis.

Our world is beautiful. We must enjoy living here. We must not spoil the natural beauty by our foolish acts of defecating, urinating and spitting everywhere, cutting trees indiscriminately and littering our neighbourhood with materials and products which are not environment friendly.

Let us pass a resolution and make a promise to ourselves henceforth. I promise :

- to Plant trees and take care of them.
- not to let people cut trees.
- to use smokeless fuel in my kitchen.
- to protect water source from pollution.
- not to waste purified water.
- to play radio/TV at low volume.
- not to use loud speakers.
- to keep my vehicle pollution free.
- to dispose of garbage in a sanitary way.
- to use sanitary latrines.

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- to treat factory waste and sewage before disposal.
- to promote rain water harvesting.
- to filter water for drinking purposes.
- to discriminate and minimise the use of fertilizers and insecticides.
- to use silencers to reduce noise.



TERMINAL EXERCISE

1. Define the terms pollution and pollutant.
2. What are the sources of air pollution?
3. How can you control soil pollution?
4. What are the effects of noise pollution?
5. Mention two pollutants which pollute both soil and water.
6. How can you reduce pollution caused by smoke in your neighbourhood?
7. Why should we not defecate, urinate and spit on soil?



ANSWERS TO INTEXT QUESTIONS

- 6.1** 1. i) air pollution, noise pollution
 ii) water pollution, air pollution
 iii) air pollution
 v) water pollution, air pollution
 vi) water pollution
 vii) soil pollution
- 6.2.** 1 i false - Wind increases the amount of dust particles in the air .
 ii. true
 iii. false- factories should be located away from cities.
 iv. true



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2.
 - i) agricultural
 - ii) solvents
 - iii) industrial
 - iv) combustion

3. use of biogas, smoke less fuel. CNG should be encouraged.

- 6.3.**
- 1
 - i) d
 - ii) b
 - iii) d
 - 2 Refer text

- 6.4**
1. Refer text.
 2. Refer text.
 3.
 - i) c
 - ii) c
 4.
 - i) b
 - ii) c
 - iii) a