UNIT
3

ENVIRONMENTAL POLLUTION

In this unit, we will learn:

- Pollution
- Kinds of pollution (Water, Air and Land)
- Effects of pollution
- Measures to reduce pollution
- Biodegradable and non-biodegradable materials

Things around us make our environment. Living things get food, oxygen, water and other necessities of life from their environment. Environmental pollution is a big challenge to life. We should make serious efforts to reduce pollution in the environment. In this unit, we shall discuss kinds and sources of pollution. Effects of pollution and measures to reduce pollution will also be discussed.

3.1 Pollution and Pollutants

Environment is not always as clean as it should be. The human activities are mixing harmful substances in it. These harmful substances can be animal wastes, industrial wastes, ash, dust and smoke, etc. The addition of unwanted materials to the environment that make it unfit for life is called environmental pollution. The materials which pollute the environment are called pollutants.

Kinds of Pollution

Air, water and land are the parts of environment. Hence, pollution can be divided into following kinds:

1. Air pollution 2. Water pollution 3. Land pollution

Air Pollution

Air environment is being polluted by toxic materials present in traffic smoke and industrial smoke. These toxic materials are the major air pollutants. Road dust and burning of fuels in homes and furnaces are also polluting the air (Figure 3.1).

Traffic smoke   **Industrial smoke**   **Burning of fuel**
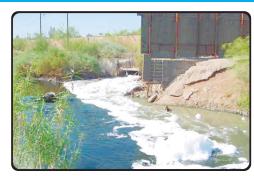
Figure 3.1 Air Pollution

Activity 3.1

• Hang a clean white tissue paper in open space.

• Observe it after a day or two using a magnifying glass.

• Can you see any materials attached with the tissue paper?

• Where did these materials come from?

Water Pollution

We are adding sewage and industrial waste into rivers, canals, streams and oceans. In this way, we are polluting the water. Highly toxic materials present in industrial waste are the major cause of water pollution (Figure 3.2). The germs present in the sewage from hospitals and gutters are also water pollutants.

Sewage discharge

Polluted water

Figure 3.2

Land Pollution

We throw our domestic trash at open places on the land. This trash includes tin cans, plastic bags, rubbish and other solid wastes which pollute the land. Agricultural wastes, fertilizers, chemicals sprayed on crops and solid waste from factories are the main causes of land pollution (Figure 3.3).

Rubbish

Chemical spray on crops

Figure 3.3

3.2 Effects of Pollution

i.   Air pollution causes diseases of throat, skin and eyes. Toxic air pollutants enter the human body with inhaled air and cause breathing difficulties, bronchitis and serious diseases like lungs cancer (Figure 3.4).

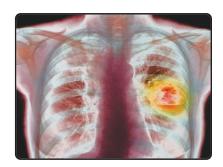ii.   In plants, air pollution slows down the process of photosynthesis. It also reduces growth in plants.

Figure 3.4 Lungs cancer

iii. Air pollutants released from industries dissolve in rain water and make it acidic (Figure 3.5). Acid rain damages trees, buildings and life in ponds and lakes, etc. (Figure 3.6).

Figure 3.5 Acid rain water

iv. Polluted water affects the animals, plants and people who use it. Germs present in polluted water cause diseases like cholera, diarrhoea, typhoid, dysentery, etc.

v. Toxic matters like mercury, lead, chromium, arsenic etc. are present in industrial wastes which pollute the water and land environment. They cause serious diseases like cancer and brain damage.

Figure 3.6 Effect of acid rain

vi. Toxic chemicals and bacteria from the rubbish and other solid wastes when washed into rivers and oceans pollute water and harm the life in water (Figure 3.7).

vii. Bacteria growing on raw sewage use much of the oxygen from water. Due to this reason, the fish and other aquatic life do not get enough oxygen and thus die (Figure 3.7).
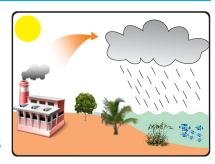

**Figure 3.7
Effect of water pollution**

viii. Oil from the tankers of a shipwreck spreads over the surface of the sea water and damages the sea animals (Figure 3.8).

Figure 3.8 Oil spill and its effects

Do you know?

Running the engine of a motor vehicle in a closed garage can make a person unconscious or even cause death due to carbon monoxide released in the smoke.

3.3 Measures to Reduce Pollution

Following steps can be taken to reduce pollution:

- Factories and industries should be shifted away from the cities;

- Industrial wastes should be treated and made ineffective before releasing into the atmosphere (Figure 3.9);

Figure 3.9
Exhaust treatment plant

- Industrial waste and sewage should not be added into the fresh water of rivers or other water bodies (Figure 3.10);

- Domestic rubbish and other solid wastes should not be thrown into the streets or open places. They must be disposed off properly (Figure 3.11);

Figure 3.10
Sewage treatment plant

- Measures should be taken to:

  (a) reduce the number of vehicles on roads;

  b) recycle the plastic wastes (cans, bottles and shopping bags);

  c) reduce cutting of trees and forests as they absorb carbon dioxide and other air pollutants and reduce air pollution.

Figure 3.11
Disposal of rubbish

Figure 3.12
CFC-free products

  d) Chlorofluorocarbons (CFCs) used in air conditioners, refrigerators or freezers if accidently released in the air will damage the protective ozone layer beyond the atmosphere of the Earth. This can lead to very serious consequences on human

health. It is therefore important that alternate to CFC should be used to avoid damage to our Earth's natural system (Figure 3.12).

3.4 Biodegradable and Non-Biodegradable Materials

Waste material or pollutants can be classified as biodegradable and non-biodegradable. The materials which are naturally decomposed into simpler substances by natural process and mix in the soil for reuse by plants and animals are called biodegradable materials.

Fig. 3.13   Biodegradable substances

Kitchen waste, tree leaves, grass, wood, paper, cotton, leather, feathers, fruits, vegetables and dead organisms, etc. are the examples of biodegradable materials (Figure 3.13).

Non-biodegradable materials cannot be decomposed into simpler forms by natural process. Glass, ceramics, heavy metals, detergents, toxic chemicals, styrofoam, plastic bags and other plastic things are the examples of non-biodegradable materials (Figure 3.14).

Figure 3.14 Non-Biodegradable substances

Impact of Non-Biodegradable Materials on the Environment

Non-biodegradable wastes never decompose and remain as pollutants. Non-biodegradable pesticides and other toxic chemicals may cause diseases in animals and plants. Non-biodegradable materials cannot be recycled in the environment by natural process.

Activity 3.2

Tick (✓) biodegradable and cross (✗) non-biodegradable material from the pictures given below.

Ways to Reduce the Impact of Non-Biodegradable Materials

The three "3R" strategy (Reduce, Reuse and Recycle) is an easy way to control pollution due to non-biodegradable wastes (Figure 3.15).

1. Reduce

We must reduce the use of natural resources to produce plastic items and other non-biodegradable materials. We should stop using plastic bags for grocery, snacks and sandwiches, etc.

2. Reuse

The things which are made of non-biodegradable materials should be used again and again for various purposes instead of throwing them to increase pollution.

Figure 3.15
3Rs strategy

3. Recycle

The used plastic goods, broken glass bottles, and tin cans can be recycled easily. We should recycle them instead of throwing them as waste.

Environmental pollution is a serious threat to life and we must share our responsibility to make our environment pollution free. You have learnt many ways to reduce pollution. However, you can conduct the following activities under the guidance of your teacher.

Activities 3.3

- Create awareness in your community about environmental pollution, effects of pollution and minimising pollution through seminars, banners and mutual discussions.

- Develop an approach in your community to reduce using plastic bags, and plastic bottled drinks.

- Plant trees especially along roadsides.

- Educate people not to throw their domestic rubbish and other solid wastes into the streets, open places or drainage systems.
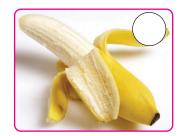
Activity 3.4

Look at the pictures and write on them the number (s) (1, 2, 3 or 4) of their relevant bins shown below.

Biodegradable	Reduce	Reuse	Recycle
1	2	3	4

Science, Technology, Society and Environment

- Government and non-government organizations have become active to create public awareness about environmental pollution and developing emphasis on adopting measures to reduce it.
- Many technologies have been introduced to control the addition of pollutants in the air, water and land environment .

KEY POINTS

- The addition of unwanted materials to the environment that make it unfit for life is called environmental pollution.
- The materials which pollute the environment are called pollutants.
- Three kinds of pollution are air pollution, water pollution, and land pollution.
- Toxic materials present in traffic and industrial smoke are major air pollutants.
- Highly toxic materials present in industrial waste and sewage from hospitals and gutters are water pollutants.
- Domestic trash, plastic bags, agricultural wastes, fertilizers, chemical sprays and other solid wastes are major land pollutants.
- Smoke, sewage water, industrial wastes, solid wastes and oil spills are the sources of pollution.
- Control on pollution is highly desirable. The public and the government must share responsibilities to control pollution.
- The materials which are decomposed into simpler substances by natural process and mix in the soil for reuse by the plants and animals are called biodegradable materials.
- The materials which cannot be decomposed into simpler substances by natural process are called non-biodegradable

QUESTIONS

3.1   Fill in the blanks.

i.   _____ is the addition of harmful materials in the environment.

ii.   Those harmful waste materials which are added into air, soil and water are called as _____.

iii.   Solid wastes which will be degraded by themselves are known as _____.

iv.   The three Rs are _____, _____ and _____.

v.   The substances which cause pollution are called _____.

vi.   Smoke is a source of _____ pollution.

vii.   Bacteria growing on raw sewage use much of _____ from water.

3.2   Encircle the correct option.

i.   Which of the following diseases can be caused by air pollution?
   a.   lungs cancer   b.   diarrhoea
   c.   cholera   d.   dysentery

ii.   Toxic matters like mercury, lead, chromium, arsenic, etc. are found in:
   a.   freshwater pond   b.   sewage water
   c.   rain water   d.   industrial waste

iii.   Typhoid can be caused by the germs present in:
   a.   fertilizers   b.   pesticides
   c.   sewage water   d.   industrial waste

iv.   Which of the following is non-biodegradable:
   a.   grass clippings   b.   feather
   c.   styrofoam   d.   paper

v.   The cause of polluted rain water is:
   a.   road dust   b.   industrial smoke
   c.   water vapours in the air d.   oil spills

3.3   Give short answers.

i.   What is environmental pollution?

ii.   Name any three sources of pollution.

iii.   Name any three land pollutants.

iv.   What is 3R strategy to control pollution?

3.4   Match the words of column A with the pictures of column B.
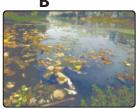
A	B

3.5   Differentiate between biodegradable and non-biodegradable substances.

3.6   Describe the effects of:

i.   air pollution   ii.   water pollution

iii.   land pollution

3.7   Briefly describe the ways to reduce:

i.   air pollution   ii.   water pollution

iii.   land pollution

3.8   What is the impact of non-biodegradable materials on the environment?