



What will happen if there are piles of garbage around us?

How is the smoke harmful to us?

How the use of polythene bags are harmful to the environment?

04

Environmental Pollution

Students' Learning Outcomes

After studying this chapter, the students will be able to:

1. Define pollution and its types.
2. Explain the main causes of water, air and land pollution.
3. Explain the effects of water, air and land pollution (unclean or toxic water, smoke, smog, excess carbon dioxide or other gases, open garbage dumps, industrial water, etc.) on the environment and life.
4. Explain the effects of fossil fuels and releasing greenhouse gases in the air.
5. Differentiate between biodegradable and non-biodegradable materials.
6. Explain the impact of non-biodegradable materials on the environment.
7. Investigate possibilities and suggest ways to reduce non-biodegradable materials.

The particular place where an organism lives is called its environment. The environment means the plants, animals, humans, sunlight, water and air which are present around us. The plants and animals are the living components of environment. Sunlight, soil, water and air are the non-living components of environment.

Environmental Pollution and its Types

Activity 4.1

1. Light a small candle. Predict, the type of pollution being added by the burning candle?
2. Hold a glass over the flames of the candle for a while. Did you see any change at the surface of the glass?
3. You have seen the soot over the glass surface. You can also touch it. The soot is an example of pollution in the environment.



Any change in the environment which is harmful to living things is called environmental pollution. The substances which cause pollution are called pollutants. Here we will study the types and causes of pollution.

Activity 4.2

Perform this activity in twenty minutes by forming four or five groups.

1. In first ten minutes discuss pollution.
2. In the next ten minutes make a list of causes of pollution in Pakistan.

Point to Ponder!

These days which one is the most dangerous environmental pollution in Pakistan?

There are three main types of pollution. These are air pollution, water pollution and land pollution.

1. Air Pollution

You would have seen smoke being emitted from vehicles and factories. Many poisonous



Forest fire smoke



Industrial smoke
Air pollution



Vehicles smoke

substances are present in smoke. Smoke pollutes the air. The burning of fuels in the kilns and homes produces carbon dioxide gas which pollutes the air. The fire in the forests also causes air pollution. Can you tell any other reason of air pollution?

2. Water Pollution

We discuss water pollution in our everyday life. Have we ever thought how the water is being polluted? The sewage, wastes of factories, insecticides and fertilizer, etc., are polluting water. The oil leakages from oil tankers and petroleum refineries are also polluting water.



Polluted sewerage water
Water pollution

3. Land Pollution

The garbage of houses and cities remain scattered on the land. There is no proper arrangements for disposal of the garbage. Sometime people do not take care while throwing garbage on land. Some people throw wastes outside their vehicles while travelling. Thus, the cities and the villages do not remain neat and clean.

Other than this, insecticides and fertilizers have chemical substances. These remain in the soil for long periods and cause land pollution. Agricultural and poisonous substances of factories are also the cause of land pollution.



Garbage
Land pollution

Activity 4.3

Write "Yes" or "No" in the given table

Reason of pollution	Air pollution	Water pollution	Land pollution
Cutting of trees	Yes	No	Yes
Polluted water			
Garbage			
Industrial wastes			
Use of chemical fertilizers or Insecticides			
Plastic			
Smoke from factories			
Burning plastic and garbage			

Effects of Pollution on Life

Activity 4.4

Can you fill the given table?

Types of Pollution	Effects of Pollution
Air pollution	
Water pollution	
Land pollution	

In Activity 4.3, your any answer will be correct or incorrect. It does not matter. Now we will study the effects of environmental pollution. Then you can correct your incorrect answer.

- (i) Germs present in polluted water are causes of the diseases.
- (ii) The poisonous substances present in the factory wastes pollute water and land environment.
- (iii) Bacteria present in sewerage use most of the dissolved oxygen present in water. The aquatic animals e.g., fish die due to lack of oxygen.
- (iv) The pollutants such as chemicals, carbon dioxide and other gases in polluted air cause throat, skin and eye diseases.
- (v) Pollutant gases present in smog cause lungs diseases and allergy.
- (vi) The poisonous substances emitting from the chimneys of factories and smoke dissolve in rain water and produce acid rain.



Disposing of garbage

It is harming not only to buildings and trees but also to the aquatic life of streams, canals and lakes.

- (vii) Poisonous substances and gases are produced by open garbage dumps. These substances cause air and water pollution.



Polluted rain water



Effects of acid rain



Effects of pollution on aquatic life

Do you know?

The pollutant gases of air combine together in presence of sunlight and produce smog. It is a combination of various gases. In winter, smog is present in the atmosphere. It reduces the visibility.

Greenhouse Effect

Greenhouse is a house made of glass. Its roof and walls are made of green coloured glass. People grow vegetables and flowering plants in it. The greenhouse remains hot inside even in the winter season. The sun rays enter in the greenhouse through its glasses.



Greenhouse

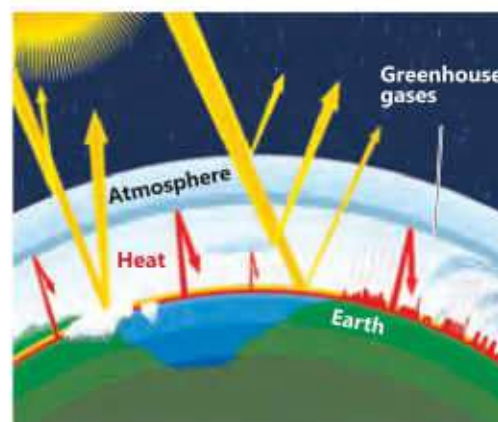
These rays produce heat inside. The heat cannot go out of the glass of greenhouse. So, the inner atmosphere remains hot.

For Your Information

Our atmosphere mostly consists of nitrogen and oxygen. Carbon dioxide, methane, nitrogen oxide, ozone and water vapours are also present in atmosphere. These are called greenhouse gases.

Carbon dioxide and other gases present in atmosphere work like the glass of greenhouse. In other words, these gases allow the sunlight to reach the Earth, but do not allow heat to leave the Earth. It is called greenhouse effect. In this way our Earth remains hot.

When fossil fuel is burnt, carbon dioxide and other greenhouse gases are emitted into the atmosphere. It results in the increase of temperature of the Earth. It is called global warming. The climate of the world is changing due to global warming. It is causing more rains and floods. The ice of North and South poles is melting at faster rates.



Greenhouse effect



Flood



Melting of Ice

Effects of greenhouse gases

Do you know?

Coal, crude oil and natural gas are all considered fossil fuel. They were formed from the fossilized, buried remains of plants and animals that lived millions of years ago on the Earth.

Due to it, the level of sea water is rising. If this process continues, the coasts and islands may disappear in the sea.

Preventive Measures to Reduce Pollution

We should shift the factories away from the cities to reduce the effects of pollution. The smoke of factories should be made ineffective before releasing in the air. Polluted water should not be poured into rivers, canals and lakes. The garbage and solid wastes of houses and factories should be disposed off in a proper way. The number of vehicles need to be reduced and smoke emitting vehicles should be banned. Cutting of trees and forests should be reduced. There should be more tree plantation.

Interesting Information

The Government of Pakistan is launching awareness campaign for tree plantation. From 2018 the Government has taken an initiative of "Billion Tree Plantation" across the country. It will be achieved in five years.

Biodegradable and Non-Biodegradable Materials

Activity 4.5

Put the things given below in separate bags. Leave them for a week. Observe it after a week. Have any changes taken place?



Wood



Bread



Water



Leather



Stone



Fruit

Why it is appropriate to bury dead bodies and peels of vegetables? In fact the dead bodies are converted into simple components by bacteria and fungi. If you throw bread, rice, meat, fruits and vegetables on the ground, you will see they have disappeared after decomposition. The materials which are broken down by natural process into simple substances and become part of the soil are called biodegradable materials. The materials that do not break down into simple substances by natural process are called non-biodegradable materials.



Vegetables and Fruits



Meat



Paper

Biodegradable Materials

Polythene Bags



Plastic Bottle



Computer Components

Non-biodegradable Materials**Ways to Reduce Non-biodegradable Things**

To reduce pollution of non-biodegradable things, the principle of "4R" is applied. "4R" means to refuse, reduce, reuse, and recycle.

Refuse**Reduce****Reuse****Recycle**

Key Points

1. Any change in the environment which is harmful to living things is called pollution.
2. The three main types of pollution are air, water and land pollution.
3. The main causes of air pollution are the poisonous substances present in the smoke which is emitted by vehicles and factories.
4. The polluted water of sewage, waste substances of factories, insecticides, fertilizers and leaking oil are the main causes of water pollution.
5. Garbage from homes, fertilizers, wastes and spray of chemical substances, etc. are the main sources of land pollution.
6. The aquatic animals die due to water pollution. Smog causes diseases of lungs, throat, skin and eyes.
7. The temperature of Earth is increasing due to increase in the amount of carbon dioxide and other greenhouse gases which have been produced by burning of the fossil fuels. It is called global warming. Due to this, the climate of the world is changing.
8. Such matters which become part of the soil after broken down by natural process into simple substances are called biodegradable materials.
9. The matters that do not break down into simple substances by natural process are called non-biodegradable materials.
10. To reduce pollution caused by non-biodegradable materials, 4R principle is used.



Weblinks: Use the following weblinks to enhance your knowledge about the topics in this chapter.

Greenhouse effect	1. https://www.nationalgeographic.org/article/greenhouse-effect-our-planet/
Pollution due to plastic	2. https://kids.nationalgeographic.com/explore/nature/kids-vs-plastic/pollution/

Exercise

1. Tick (✓) the correct option.

- i. Which disease is caused due to air pollution?
(a) Diarrhea (b) Typhoid
(c) Lungs cancer (d) Cholera
- ii. The germs present in it cause typhoid.
(a) Sewerage water (b) Fertilizers
(c) Factory waste (d) Insecticides
- iii. Which one of these is non-biodegradable?
(a) Feathers (b) Paper
(c) Leaves of plants (d) Polythene bag
- iv. Which of the following is NOT a greenhouse gas?
(a) Oxygen (b) Methane
(c) Ozone (d) Carbon dioxide
- v. Which one of the following acts causes most of the air pollution?
(a) Collecting rubber (b) Burning rubber
(c) Reusing rubber (d) Recycling rubber

2. Write short answers.

- i. Write three causes of air pollution.
- ii. What are the four effects of pollution on life?
- iii. What is greenhouse effect?
- iv. What will be the effects of global warming?
- v. Write three ways of preventive measures to reduce pollution.

3. Constructed Response Questions:

- i. What is the main cause of pollution?
- ii. Why Government of Pakistan has banned the use of polythene bags?
- iii. If it is written D2W on the polythene bags then why there is no ban on the use of such bags?

4. Investigate:

- i. What is the relationship between diseases and pollution?

- ii. Identify biodegradable and non-biodegradable materials present in your environment.

5. Project: **Preparing Organic Fertilizer**

Material Required:

- i. Plastic bucket
- ii. Peels of vegetables, fruits and egg shells
- iii. Grass
- iv. Dry leaves
- v. Water
- vi. Wooden rod

Procedure:

- i. In a small plastic bucket put peels of vegetables, fruits, egg shells, dry leaves and some grass.
- ii. Pour water so that all of these become wet.
- iii. Stir with the help of a wooden rod so that these can get oxygen.
- iv. When these things become brown it means the fertilizer has been made. It is called organic fertilizer. Now you can use it for plants.

