

Unit 10

Environmental Problems and Management

After studying this chapter the students will be able to:

- ◆ Identify the regional and global environmental problems such as ozone depletion, global warming, acid rain, greenhouse effect, desertification and climate change, solid and hazardous wastes.
- ◆ Describe the natural disasters caused by earthquakes, storms including El-Nino and La-Nina.
- ◆ Identify the legislation or laws on environmental problems such as ozone depletion, global warming, air pollution, water pollution, drinking water quality and toxic substances.
- ◆ Describe the control strategies that can be used for treating air and water pollutants.
- ◆ Describe the harmful effects of the excessive use of Television, mobile and computer on individual's health.

INTRODUCTION

Development and prosperity of the modern age has resulted in improving the quality of life and the living standard of people throughout the world. But this development and prosperity has been accomplished by paying heavy price in the shape of environmental degradation and climatic change which have global impacts. No matter how developed or otherwise a nation is, we all inhabit the same planet Earth and we have to tackle the issues and challenges of environmental degradation as member of the international community. In this chapter you will study some of the serious global environmental issues, the legislation addressing these problems and possible measures to control them.

10.1 REGIONAL AND GLOBAL ENVIRONMENTAL PROBLEMS

In a region sustainable development depends on environment. Local and global environmental issues are closely linked with each other. For example, in order to meet the demand of growing population, people in different parts of the world are transforming forests and natural grasslands into farmlands. There has been an increase in the use of



Fig: 10.1 Forests are being cleared for agricultural purposes.

nitrogenous fertilizers and irrigation practices. These have a direct impact on the environment. Land erosion, water logging and salinity of precious agricultural lands have resulted in land degradation. Natural ecological systems have been damaged, affecting the biodiversity of an area.

10.1.1 Ozone Layer Depletion

About 10-45 kilometres above the Earth's surface, there occurs a layer of ozone encircling our planet. This layer is present in the stratosphere part of the atmosphere. It shields the Earth from most of ultraviolet radiations coming from sun. Ozone layer is capable of absorbing 97-99% of the harmful ultraviolet radiations that are emitted by sun.

The depletion of ozone became known to us in 1985, with the discovery of a big hole in the ozone layer over Antarctica continent. The loss of ozone is caused by commercially important compounds called chlorofluorocarbons (CFCs) of which the most important is Freon. When a CFC drifts up into the stratosphere it releases active chlorine which reacts with the ozone molecules of ozone shield. A single atom of chlorine destroys about 100,000 molecules of ozone. CFCs are used as coolants in air conditioners and refrigerators, as foam for insulation and packaging and as medical sterilizers.

With the depletion of ozone layer, higher levels of ultraviolet radiations reach the surface of the Earth. This causes skin cancer, eye cataracts, weak immunity and damage to crops.

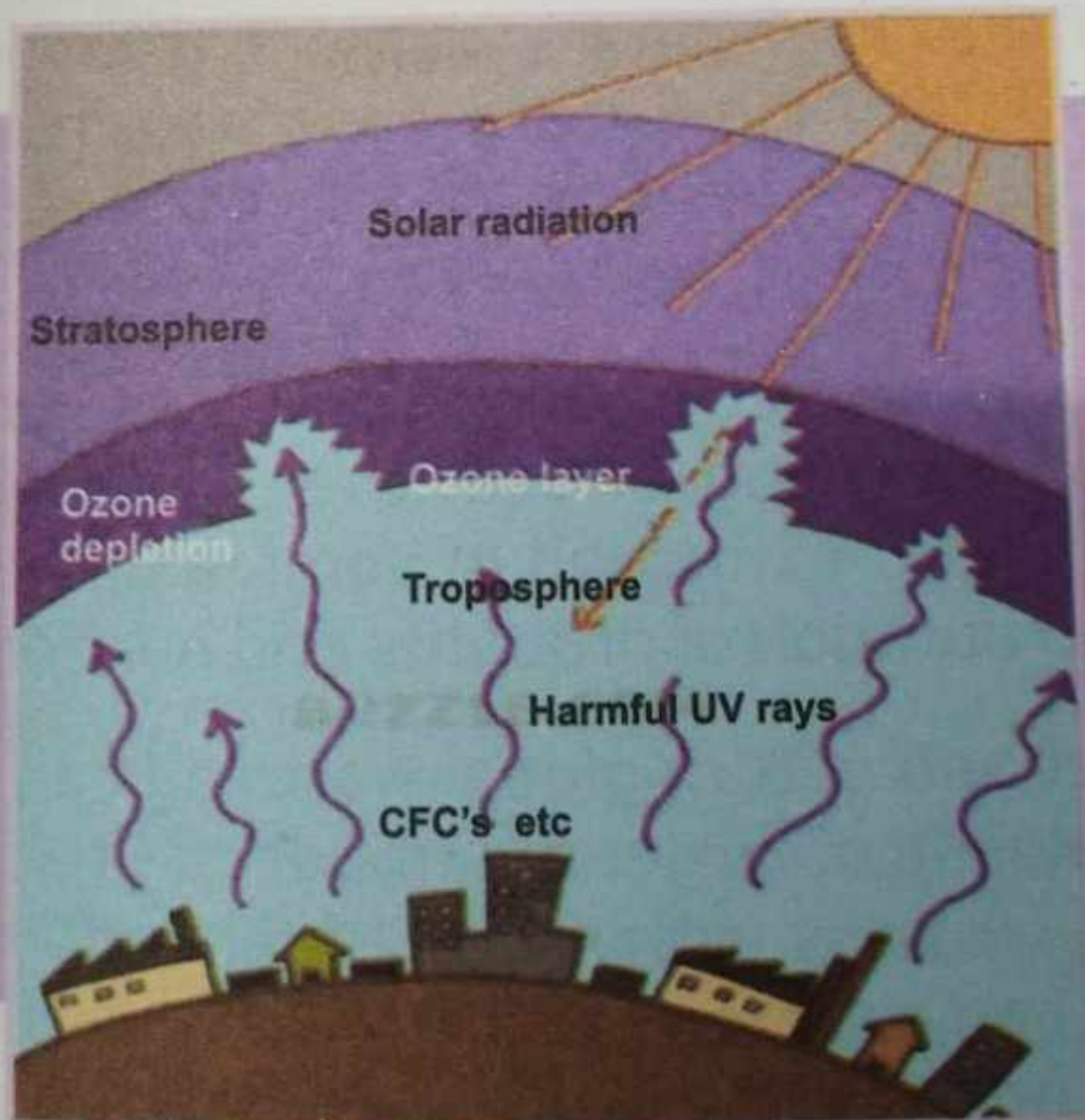
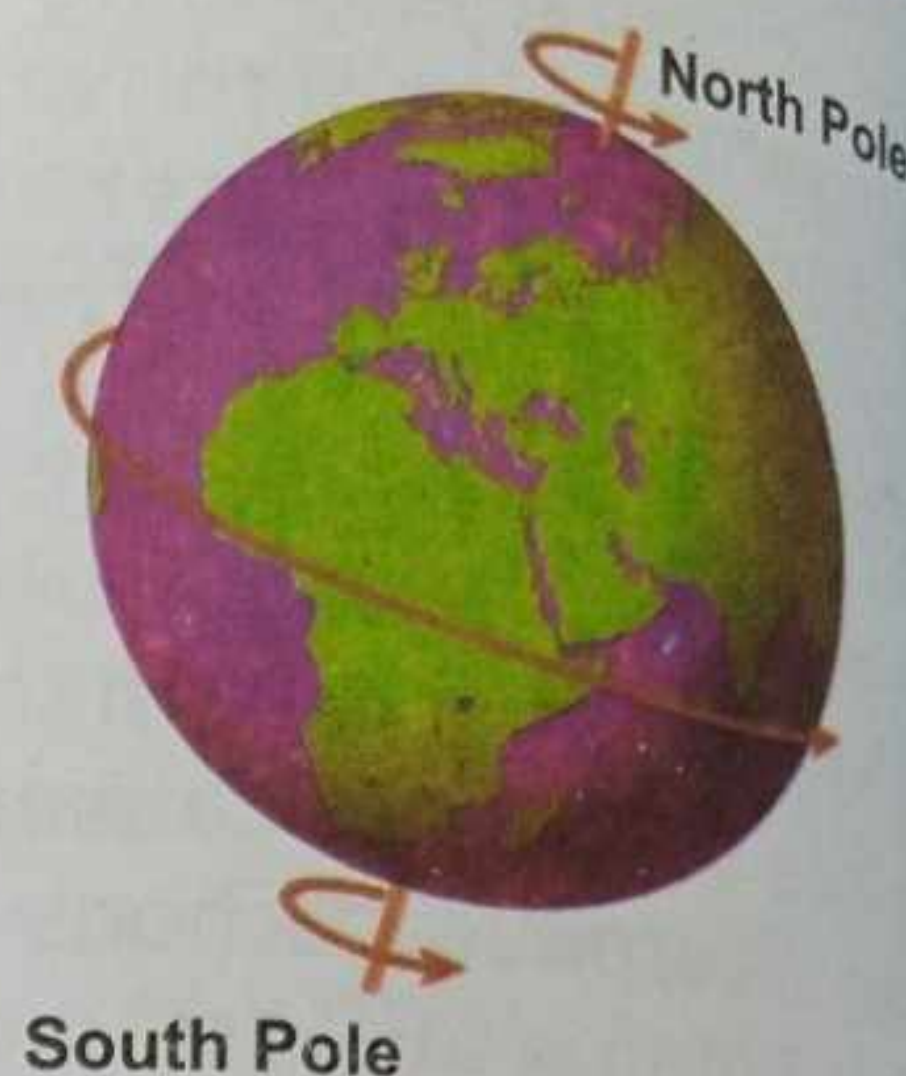


Fig: 10.2 Ozone layer depletion.

FOR YOUR INFORMATION

Ozone loss occurs mainly at the poles

The ozone-destroying reactions take place most rapidly under certain conditions in the stratosphere. Scientists often refer to the part of the atmosphere where ozone is most depleted as the 'ozone hole', but it is not really a hole – it is a vast region of the upper atmosphere where there is less ozone than elsewhere.



10.1.2 Global Warming and Green House Effect

The greenhouse effect in the atmosphere cause global warming. The carbon dioxide in the atmosphere allows solar radiations to pass through, but does not permit heat to radiate back into the space. Instead, the heat is reflected back to the Earth's surface which heats up the atmosphere of the Earth. During the past several decades greenhouse gases have accumulated to such an extent that the earth's temperature has increased by 0.8°C as a result of this phenomenon.

The global warming produces harmful effects such as melting of polar ice resulting in rising of sea level, changes in the rainfall pattern, migration and extinction of some animals and increasing the frequency and duration of droughts and hurricanes.

Greenhouse effect and in turn global warming can be controlled by preventing the release of larger quantities of greenhouse gases by reducing the tremendous use of fossil fuel and wood for burning. Use of fossil fuels can also be reduced by using alternate means like electricity, solar energy etc.

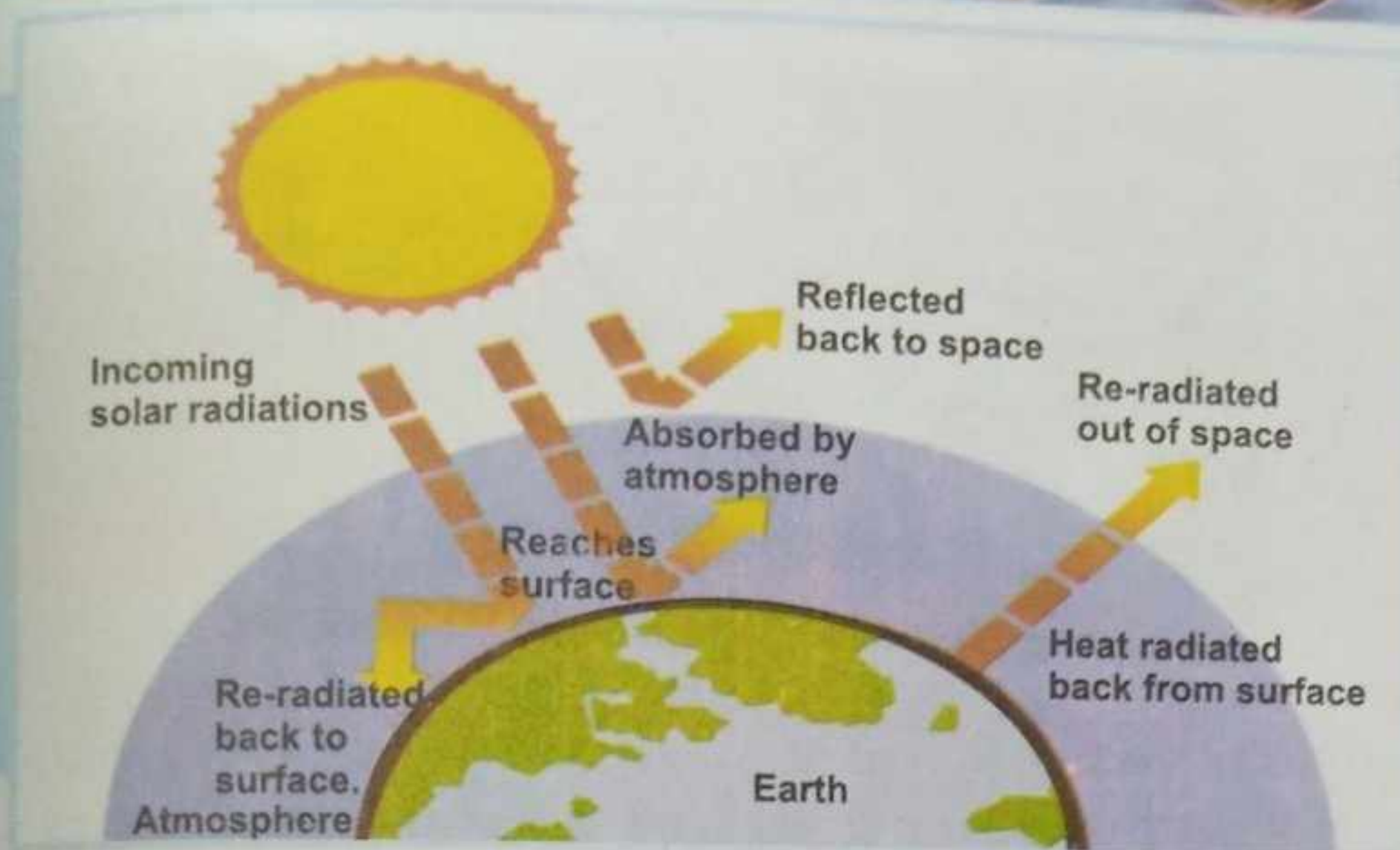


Fig: 10.3 Global Warming and the greenhouse effect.

Increase in the forest area is also a good remedy to reduce carbon dioxide in the atmosphere. Manufacture and use of CFCs should be eliminated completely.

Most greenhouses look like a small glass house. Greenhouses are used to grow plants especially in winter. Greenhouses work by trapping heat from the sun. The glass panels of the greenhouse let in light but keep heat from escaping.



10.1.3 Acid Rain

Acid rain is one of the most dangerous forms of air pollution. It is a widespread phenomenon which affects the living and non living things equally. For years it can remain in an area undetected and for this reason it is called as unseen plague. Technically, acid rain is rain that has a larger amount of acid in it than normal rain.

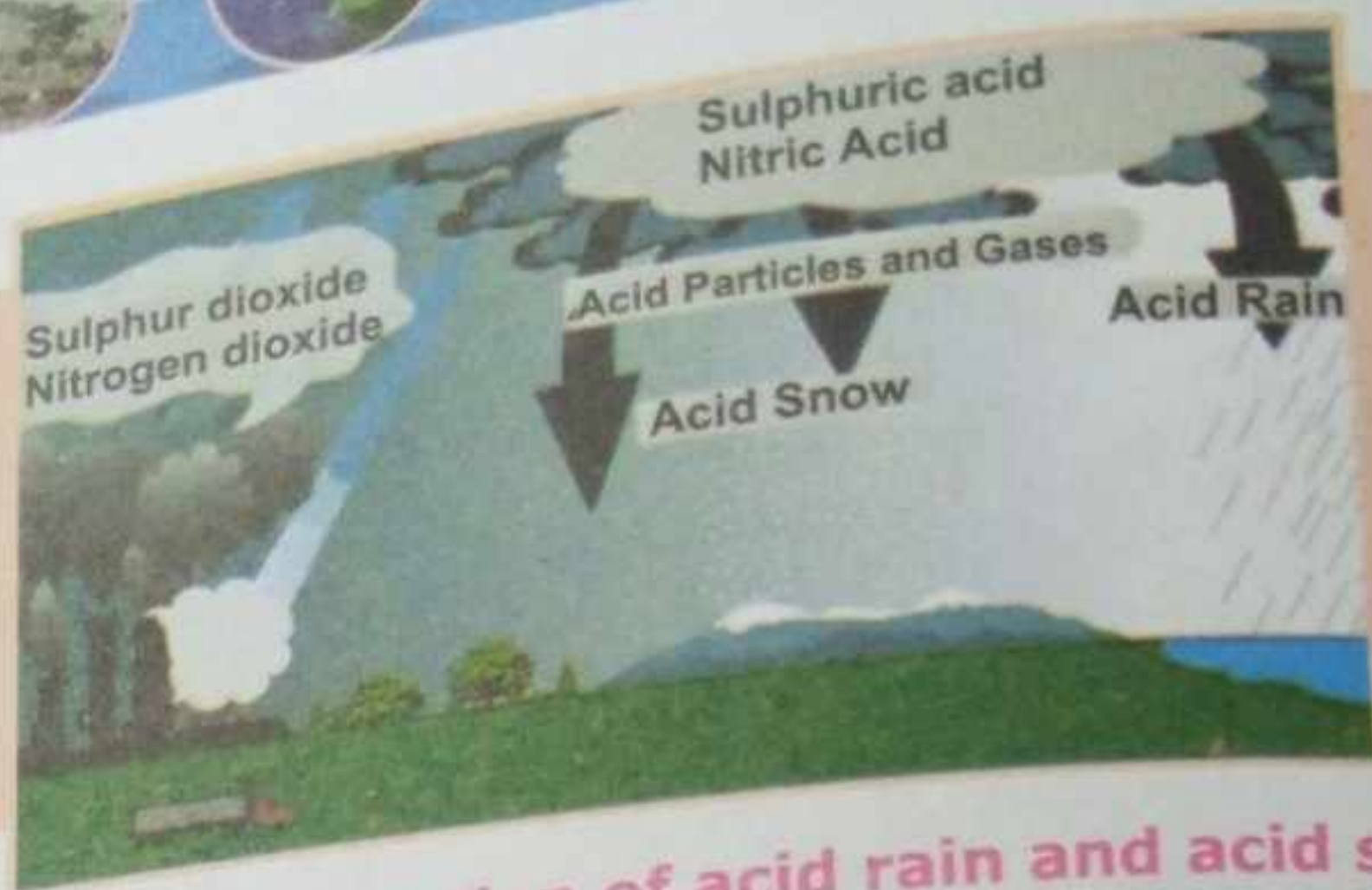


Fig: 10.4 Formation of acid rain and acid snow.

Acid rain is caused by smoke and gases that are given off by factories and automobiles that run on fossil fuels especially coal. When these fuels are burnt to produce energy, the sulphur that is present in the fuel combines with oxygen and becomes sulphur dioxide; at the same time some of the nitrogen in the air converts into nitrogen oxide. Sulphur dioxide and nitrogen oxides in the atmosphere dissolve in rainwater to form sulphuric acid and nitric acid respectively. Rain containing these acids is known as acid rain.

DO YOU KNOW?

Acid rain can also damage buildings and historic monuments, especially those made of rocks such as limestone and marble containing large amounts of calcium carbonate. Acids in the rain react with calcium compounds in



Before acid rain After acid rain

stones to create gypsum, which then flakes off. This phenomenon related to acid rain is termed as stone cancer.



When this acid rain falls on buildings, it slowly dissolves the limestones and mortar. When it falls on plants, it damages their leaves and retards their growth. Falling on the earth, acid rain dissolves aluminum salts in the soil and washes them into rivers and lakes. These salts in higher concentration are poisonous to fish and other marine life.

10.1.4 Desertification

Desertification is a process whereby a productive land either through climatic variations or through unwise utilization by humans gets degraded and changes into desert. Sometimes a particular area experiences high and sustained temperatures lasting for months with infrequent and irregular rainfall which leads to dry conditions and drought. The overall impact of such sustained harsh conditions result in failure of vegetation to grow and sustain itself. If such conditions in such an area are being aggravated by overgrazing and deforestation, the situation becomes worst and desertification occurs.

Yet another major reason for desertification is the excessive use of land for agricultural activities. In order to feed the growing population, farmers use land excessively for better yields.



Fig: 10.5 Removal of vegetation exposes soil to the process of desertification.

However, this unwise utilization of land leads to its degradation and loss of soil fertility. As the land is not given proper time to refresh itself, as a result it becomes unfit for further crops growing. Gradually the upper fertile layer of soil becomes vulnerable to the forces of erosion. If such hostile conditions are sustained for certain period of time the process of land degradation continues and once fertile and productive land changes into desert

10.1.5 Climate Change

Different regions of the world are characterized by different set of climatic conditions. These conditions sustain themselves over a period of many years. On the basis of these average weather conditions we can say that a certain area has a particular type of climate. Climate of an area depends upon the amount of sunlight it receives, some geographic factors like altitude, distance from the sea, vegetation cover available, wind, rainfall pattern, topography of the area etc. In recent past there has been a constant accumulation of greenhouse gases in the atmosphere which has resulted in global warming. At the same time greenhouse effect keeps the temperature of the Earth suitable for many life forms.



Fig: 10.6 Global climatic change has resulted in melting of Greenland's ice sheet.

Environment

In the absence of greenhouse effect the temperature of Earth would have gone low enough to make life difficult. Global temperatures in the past one hundred years have been increasing more rapidly than the historic record shows and this increase has been attributed to increasing amounts of the greenhouse gases which are trapping heat. At the global level climatic change has made significant effects on the environment.

In addition to a rise in average global temperature, there have been other changes that indicate that climate indeed is changing. These include, shortening of winter, fast shrinking of Earth's ice cover, killing of coral reefs due to warming sea water, increase in mosquito-borne diseases, rising sea levels, increased precipitation (rainfall etc.) in most areas and extreme weather becoming more common.



Fig: 10.7 Corals, sponges and seaweeds cover most of the surface of many coral reefs are affected by warm temperatures.

10.1.6 Solid and Hazardous Wastes

Different types of industries and household activities use chemicals for various purposes. Among these some chemicals are harmless and are disposed safely in the environment. However, there are some chemicals which when released in the environment have the potential to be harmful and dangerous for living organisms and the environment as a whole. Such types of chemicals are known as hazardous wastes. These wastes can occur in liquid, solid, or gaseous forms.

Industrial sector releases certain solid wastes which are non-biodegradable i.e these do not break down by biological processes and remain on land as such for a longer period of time. Such material include polythene bags, plastics etc. If these items are burnt in open they pose more serious threats.

Hazardous wastes include used chemicals like pesticides, cleaning fluids or the by-products of certain manufacturing processes. Some of the more serious wastes are nuclear wastes from nuclear reactors which have long term harmful effects on the health of living organisms. Dichloro-diphenyl- trichloroethane (DDT) is yet another hazardous waste which has serious implications on human health.



Fig: 10.8 Solid and hazardous wastes.



10.2 NATURAL DISASTERS

Planet Earth at times encounters tremendous changes which occur deep inside it or on its surface. Such changes are called natural disasters. These have the capacity to bring significant changes in the ecological systems. Natural disaster produce such a huge force that it can cause damage to the shape of the land or to the lives of people and other living things living in it. Natural disasters may be in the form of:

- ◆ Floods
- ◆ Droughts
- ◆ Volcanic eruptions
- ◆ Earthquakes
- ◆ Cyclones or Hurricanes
- ◆ Avalanches
- ◆ Forest fires etc.



Volcanic eruptions



Earthquake



Hurricanes



Floods

Fig: 10.9 Natural disasters.

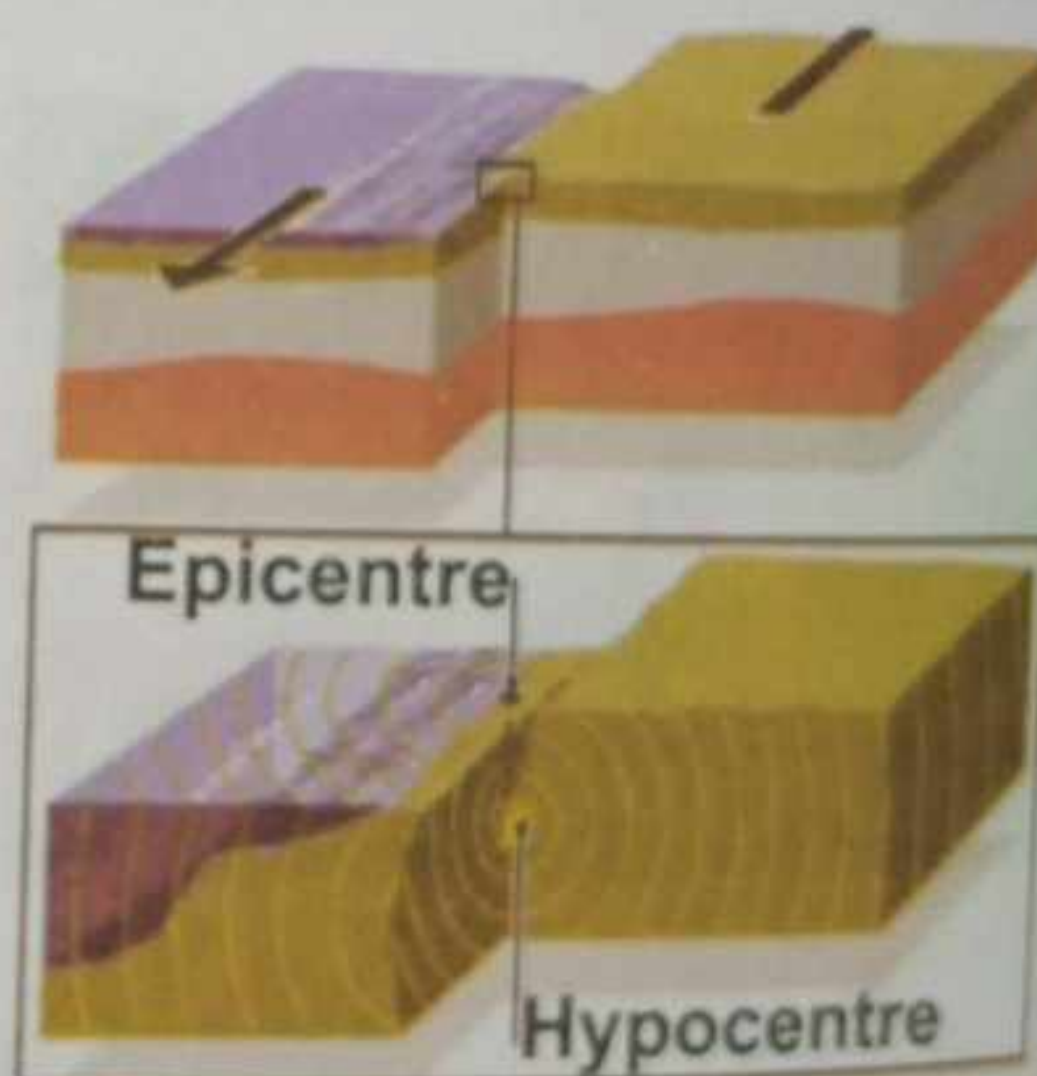
1.1 Earthquakes

An earthquake is an intense or forceful shaking of the ground. It is regarded as the most destructive phenomenon of nature. When an earthquake strikes an area it brings fear, destruction and suffering. Often huge earthquakes are followed by aftershocks. During a severe earthquake the ground splits apart.

Earth is divided into plates. When these plates move against each other friction produces giant shock waves which move upwards towards the surface causing the earthquake.

DO YOU KNOW?

Earthquake is manifested when two tectonic plates move suddenly against each other. The rocks usually break underground at the hypocentre and the earth shakes. Waves spread from the epicenter, the point on the surface above the hypocentre. If a quake occurs under the sea it can cause tsunamis.



TIDBIT

Japan is the region in the world where earthquakes occur frequently and are of severe nature.

FOR YOUR INFORMATION

- ◆ **Earthquake of Oct 8, 2005**
Magnitude on Richter scale: 7.6
- ◆ 87,000 Dead
- ◆ 100,000 injured
- ◆ 171,884 houses completely demolished.

(According to World Bank Report)



DO YOU KNOW?

Richter scale is used to measure the strength of earthquakes.



10.2.2 Storms

A storm can be defined as a violent disturbance of the atmosphere with strong winds and usually rain, thunder, lightning, or snow. It affects environment and results in severe destructive weather. Lives and property of the people are at risk in storms because it brings along with it strong wind, hail, thunder and lightning. Some of the negative impacts of storms are flooding, fallen trees and billboards resulting in road blockades, fire accidents, break down of communication system etc.

DO YOU KNOW?

In a cyclone which is storm winds spin around in a giant circle with strong force good enough to uproot trees and destroy buildings.



10.2.3 El Niño and La Niña

A phenomenon in which a change in temperature between the ocean and atmosphere takes place in the east-central Equatorial Pacific region is called as El Niño-Southern Oscillation (ENSO) cycle.

El Niño and La Niña are two phases of this cycle. La Niña is the cold phase and El Niño is the warm phase of ENSO cycle. ENSO cycles make profound impacts on ocean and all those processes associated with oceans. Apart from this ENSO cycle also affects global weather conditions.

ENSO cycle lasts for 9 to 12 months and is repeated after every three to five years. The warm phase occurs more frequently than cold phase. El Niño or the warm phase effect climatic conditions around the world.

TIDBIT

El Niño means The Little Boy, or Christ Child in Spanish. La Niña means The Little Girl in Spanish.

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Impacts of El Niño and La Niña

El Niño results in an increase in the average ocean surface water temperature in the region and causes climatic change around the world. It also causes torrential rains across the west coast of North America and South America and warm water reduces the fish population.

Strong rains and damages caused by flooding were noticed from 1965-1966, 1982-1983, and 1997-1998. California to Mexico to Chile were the worst affected regions. La Nina is responsible for the opposite effects on climate as El Nino. For example, a major La Nina event in 1988 caused significant drought across North America.



Fig: 10.11 Effects of El Nino and La Nina.

10.2.4 International Laws and Environmental Issues

We as citizens of the world live in an environment where we share with each other different natural resources. With growing trends of industrialization and development, economic prosperity has brought with itself certain environmental concerns. Environmental problems and issues whether these are local, regional, or global in nature, need to be addressed with the cooperation of people and governments.

At the international level there has been an increasing demand for addressing the environmental issues backed by strong legislation because these are closely linked and affect sustainable development.

It was in these circumstances that international environmental law as a separate area of public international law was introduced in Stockholm Conference on Environment in 1972. Since Stockholm Conference the need for legislation in the field of environment has increased gradually.



Fig: 10.12 World leaders at Rio de Janeiro Brazil.

At present the environmental issues in focus are destruction of tropical rain forests, ozone layer depletion and global warming, international trade in endangered species, protection of wetlands, transboundary nuclear air pollution, dumping of hazardous wastes, groundwater depletion, oil spills etc.

At international level cooperation has fostered by treaties, resolutions and agreements finalized by intergovernmental organizations. At home countries are having national laws and regulations to protect the environment.

Generally, the scope of environmental laws can be summarized into two categories. Firstly pollution control and remediation and secondly conservation of natural resources.

Following is the list of some of the important international laws pertaining to environmental issues.

- Convention on Biological Diversity
- Convention on International Trade in Endangered Species
- Framework Convention on Climate Change
- Law of the Sea (LOS)
- Stockholm Convention on Persistent Organic Pollutants

10.3 CONTROL STRATEGIES FOR TREATING AIR AND WATER POLLUTANTS

Pollution can be defined as the process by which harmful substances are added to the environment. It is any undesirable change in the environment that adversely affects the living organisms. Pollutants may be solid, liquid or gaseous chemicals produced as byproducts or wastes. These chemicals pollute air, water, soil and food. In the age of industrialization fossil fuels are being used as energy which in turn have resulted in various environmental problems.

In the previous classes you have already learnt about various types of pollution. In this section you will study in detail air and water pollution. Both have significant effects on our life.

10.3.1 Air Pollution

Air pollution is dangerous to human health, harms plants and animals, damages materials from fabric to stone work. There are large number of pollutants which are the cause of air pollution (Table 10.1). Air pollution may result from the incomplete burning of fuels such as coal, oil, petrol and wood. Air pollution due to human activities includes exhausted fumes from automobiles, chimney fumes emitted from the factories, burning of garbage and other wastes and the use of chlorofluorocarbons (CFCs) etc. The harmful gaseous pollutants are sulphur dioxides, nitrogen oxides, carbon monoxides, carbon dioxides and lead. At high concentration these gases have a damaging effect on both plants and animals. Generally these pollutants cause photochemical smog, acid deposition, greenhouse effect and ozone shield destruction. You have already studied in detail about acid rain, greenhouse effect and ozone layer depletion.



Fig: 10.13 Air Pollution in city.

One of the more common effects of air pollution is photochemical smog, a mixture of smoke and fog. It is produced when sunlight and ozone in the atmosphere act on oxides of nitrogen and unburnt hydrocarbons released from automobile exhausts. Smog is irritating to eyes and lungs and also damages plants.

Table 10.1 Air pollutants and their effects

S.No	Air Pollutants	Source	Environmental effect
1.	Nitrogen oxide	automobiles and fossil fuels	Ozone shield destruction, Green house effect, Acid deposition and Smog.
2.	Hydrocarbons	Automobile, paint solvent and pesticides	Photochemical Smog
3.	Sulphur dioxide	Fossil fuel	Acid rain
4.	Carbon monoxide	vehicle exhaust	Green house effect
5.	Carbon dioxide	vehicle exhaust, fossil fuel, deforestation	Green house effect
6.	Methane	vehicle exhaust, farms	Green house effect and ozone shield destruction.
7.	Chlorofluorocarbons	Refrigerants and plastic foam	Ozone shield destruction and green house effect.
8.	Halogens	Fire extinguishers	Ozone shield destruction

FOR YOUR INFORMATION

One of the most destructive type of air pollution is radioactive pollution released from malfunctioning nuclear power stations. One such accident occurred in Chernobyl in 1986 where Radioactive isotopes emitted from the burning reactor spread over areas presently parts of Belarus, Ukraine and Russian Federation. Radioactive emissions has resulted in spreading different types of cancers in these areas even in later decades.



DO YOU KNOW?

In the year 1952 when 4,000 people died prematurely in a single week in London, England because of severe air pollution. This was followed by another 8,000 deaths during the next few months.

METHODS TO REDUCE AIR POLLUTION

- Air pollution can be minimized by adopting the following measures.
- We can cut down the burning of fossil fuel by the using alternative means like biomass energy, solar energy etc.
 - In the field of agriculture use of pesticides can be reduced by using new varieties of plants which are pest resistant.
 - Lead free petrol can be used in vehicles.
 - Deforestation should be checked and more plants should be grown.
 - Emission from industries should be controlled and treated before releasing them into the atmosphere and by following strict laws.
 - Use of refrigerators, air conditioners, air fresheners etc. may be reduced to reduce the amount of CFCs emissions.



Fig: 10.14 Alternate forms of energy.

10.3.2 Water Pollution

There are three basic environmental concerns of water pollution i.e. surface water, ground water and oceanic water pollution.

Table 10.2 Different kinds of water pollution and their sources.

S.No	Kind of water pollution	Source of pollution
1.	Surface water pollution	Acid rain, pesticides, industrial waste, acid water from mines, fertilizers, organic waste, nuclear reactor wastes etc.
2.	Ground water pollution	Leakage from sewage pipes, septic tanks, irrigation, industrial and domestic wastes, that percolates down.
3.	Oceanic pollution	Waste dumping, pollutants carried by rivers, offshore mining, shipping and large oil spills, dumping of nuclear waste.

A. Sources of Chemical Water Pollution

Water pollution is brought about by industrial wastes, municipal wastes, agricultural wastes, fertilizers, pesticides etc. The movement of rain or irrigation water over land picks up pollutants such as fertilizers, herbicides, and insecticides and carries them into rivers, lakes, reservoirs, coastal waters, or groundwater.

The chemical wastes degrade the water quality and are harmful to other aquatic organism. D.D.T and other pesticides may pollute water thus decreasing population of fish and fish eating birds.



Fig: 10.15 Water Pollution.

Industries pollute water by adding chemicals like acids, alkalis, salts, pesticides, detergents, phenols and other compounds into it. This polluted water is highly toxic that may either kill the microorganisms that purify water or inhibit their growth.

Chlorinated organic compounds such as dioxins are released from paper and pulp mills. Leather tanneries are important source for earning precious foreign exchange. However, these produce a significant amount of solid waste in the form of sludge, hair and hide. The waste water discharged from these factories contains chromium, acids, sulfides and chlorides.

Petrochemicals and benzene from mines can be harmful.



Fig: 10.16 Paper and pulp mills release dioxins.



Fig: 10.17 Leather tanneries.

Petrochemical industries discharge wastes that contain phenols, and benzene, suspended solids, oils and grease. Water discharged from mines and stainless steel production release metals, such as copper, nickel, and chromium. High concentrations of these metals can be harmful to human health.

B. Health Effects

Water makes approximately 70% of the body tissues and is essential component of cell protoplasm. Its deficiency in the body causes dehydration which can be fatal. Two to three liters of water is lost daily in urine, sweat and faeces. This loss of water is compensated by drinking water.

So the direct route of exposure to pollutants in water is by drinking contaminated water or by eating food cooked with water having toxins in it.

Frequent use of contaminated water for drinking purpose can cause irritation or inflammation of eyes and nose, skin, and gastrointestinal system.

Contamination of copper, arsenic, or chromium in drinking water can cause liver toxicity. Excretion of certain chemicals such as cadmium, copper, mercury, and chlorobenzene through kidneys can damage these organs.

C. Methods to reduce water pollution

Water pollution can be reduced by adopting the following measures.

- i. Sewage treatment plants can be built to help degrade organic wastes.
- ii. Human and animal wastes need to be disposed off properly.
- iii. Use of pesticides can be reduced by alternative means e.g introducing friendly insects to protect crops from pathogens. This is called biological control.

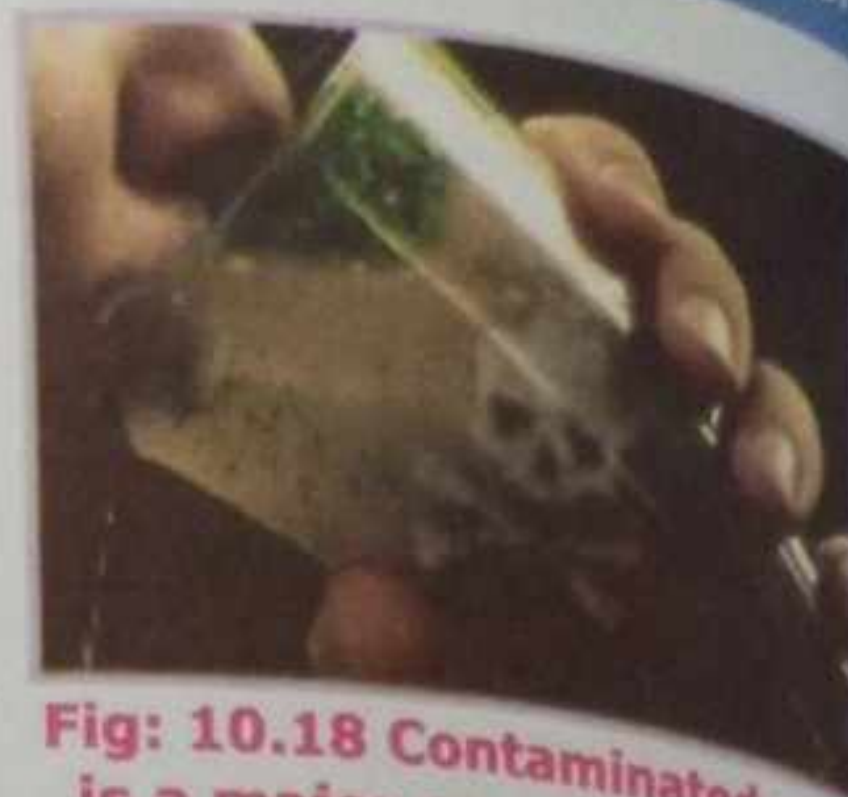


Fig: 10.18 Contaminated water is a major source of diseases in Pakistan.



Fig: 10.19 Biological control in action.

- iv. Industrial and domestic wastes should be treated properly before releasing them in water bodies. For this purpose waste treatment plants are used.
- v. Unnecessary use of fertilizers and pesticides must be avoided.

10.4 PROTECTION AT INDIVIDUAL LEVEL

Progress and development in the field of technology has made possible for us to get maximum benefit from the tools and gadgets of modern age. These devices have become very much part and parcel of our daily life. On one hand these devices are useful and productive. On the other hand they are one of the biggest source of entertainment for us.

Apart from the positive aspects of these modern gadgets and tools, these are putting certain negative impacts on their users, especially in case if these are used indiscriminately. In the following section you will study some of devices and machines which have transformed the life of the present day human being but their excessive use can be harmful for individual health.

10.4.1 Harmful Effects of Excessive Use of Television

Television is an excellent entertainer on one hand and useful educator at the other hand. It is one of great invention of all time. Television is watched by people of all ages. For some it provides information and education and for other it provides non stop entertainment.

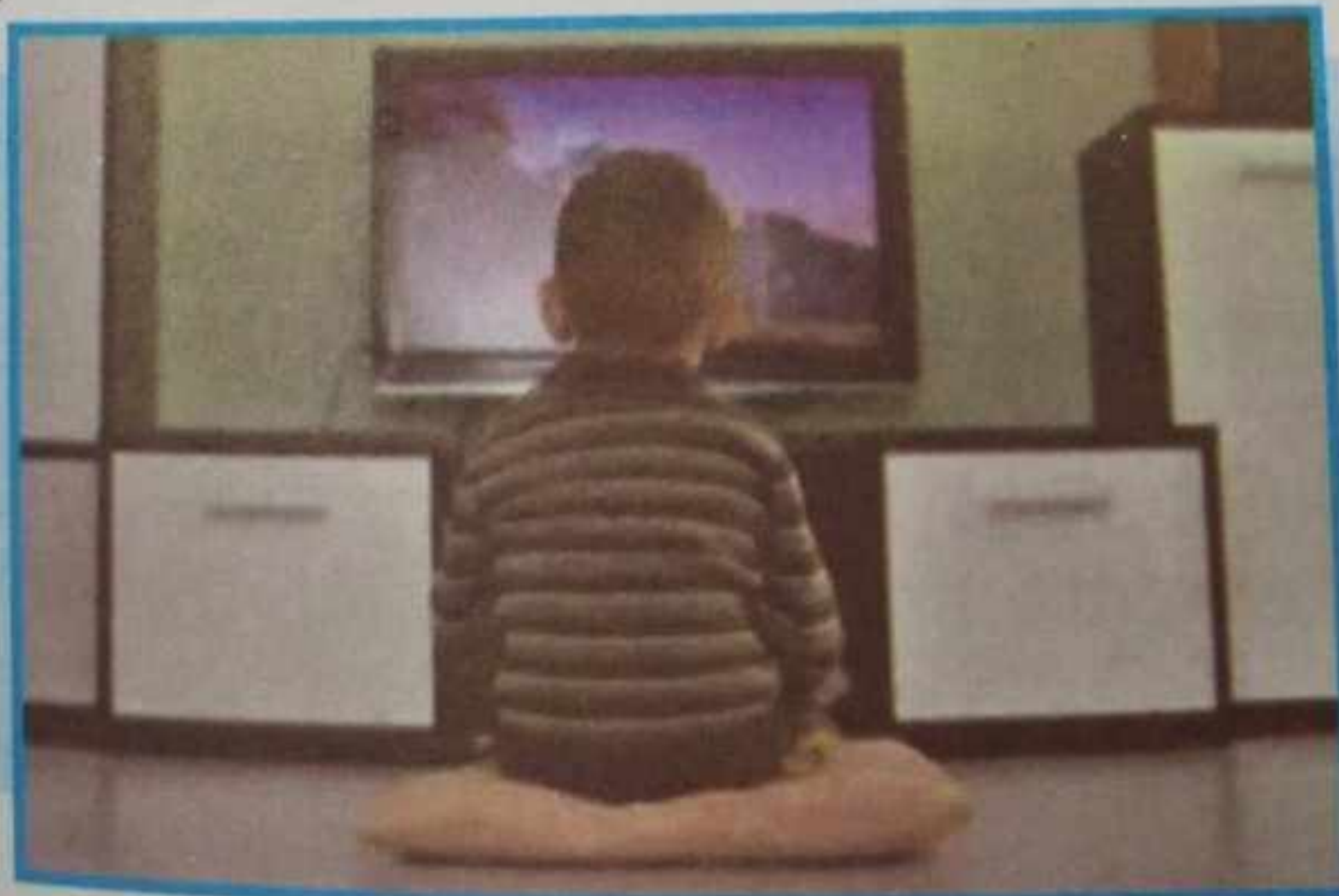


Fig: 10.20 Watching too much TV is harmful.

Watching Television in moderation is a good activity. However, watching too much television is harmful. It is common that children are glued to television and they spend maximum time watching their favorite programs. Recent research suggests that children who spend more than 4 hours continuously per day watching TV are more likely to be overweight. In much older people it can lead to obesity and heart diseases.

When you watch television your thinking mechanism stops and your focus is to listen and watch the programs being aired. In this situation you watch news, analysis, reports, documentaries being prepared by different persons with diverse view points. This situation often creates an environment where you can be easily misinformed and manipulated leading you to make an opinion that is not yours but is based on the analysis and research of those who produced such programs.

Watching too much television often leads to behavioural changes as seen in young children who watch aggressive cartoons, movies etc become violent and develop a destructive nature.

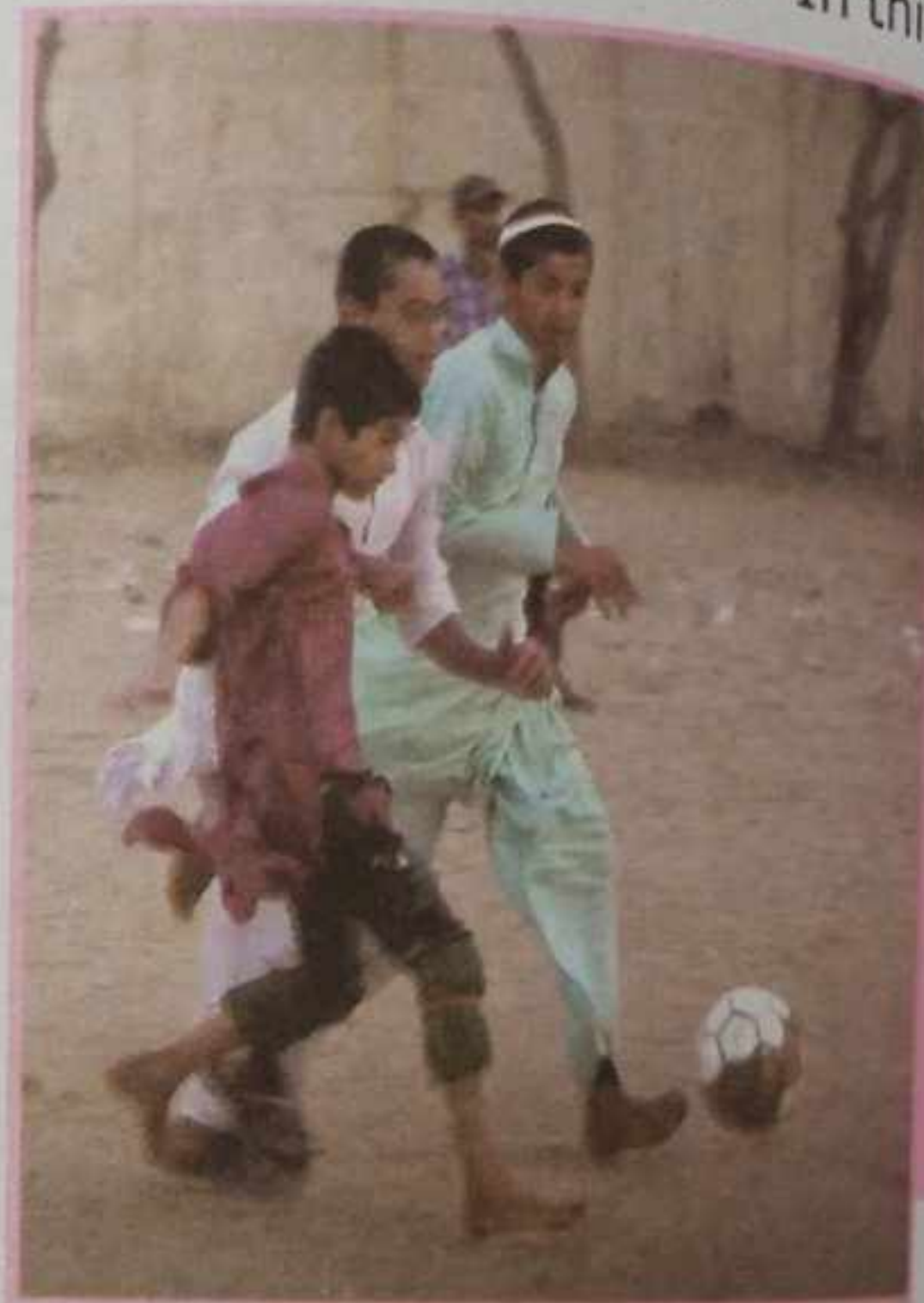


Fig: 10.21 Physical activities help in healthy development of the body.

Our social development is also affected due to the time we decide to spend watching too much television. It is better to play different sports in the playground instead of watching them on television.

Television even influences your spending habits. Often different types of advertisements project wrong information and viewers often believe whatever is expressed in glamorous way. So it is desirable to watch television in moderation and use your thinking and analytical abilities before making opinions and choices.

10.4.2 Harmful Effects of Excessive Use of Mobiles

In today's world one could not think of life without a cellular or mobile phone. It has become one of the fundamental means of communication in the world. It provides an easy and efficient way to get in touch with our family and friends. Every one of us spends a considerable amount of time using mobile phone. Despite its usefulness using too much mobile phones can put negative effects on our health.

In a mobile phone there is a small transmitter and a receiver system. This system sends and receives calls in the form of radio waves. Adults and especially children can suffer the long-term effects of radiation waves on the brain. Mobile phone used in excess can have serious implications on our health especially in youth. The high frequency radio waves emitting from the mobile put negative effects on our stress levels and cause sleep disorders.

TADBIT

There are an estimated six billions subscriptions of mobiles worldwide and the number is increasing every day.



Mobile Phone Side Effects



Fatigue



Headaches



Loss of sleep



Memory loss



Ringing ears



Joint pains

Fig: 10.22 Mobile phones have some serious effects on the body.

Environmental Management

You might have noticed a greasy oil residue on mobile phone especially on its screen. This is a breeding surface for many germs. While managing text messages and e-mails frequently at rapid speed can cause pain and inflammation in the joints of hand bones. If you hold the phone between your neck and shoulders while talking during work it can cause back pain. Focusing more closely on the mobile screen for text messaging and other tasks can harm your vision.

Though in the field of communication technology cell phone has revolutionized communication in the 21st century but its excessive use is harmful for our health. So care should be taken while using mobile phone technology.

10.4.3 Harmful effects of excessive use of computer

We are living in the age of computers where most of our daily tasks in one way or the other are dependent on computers. As an electronic machine computer quickly organizes, analyzes and presents the information supplied to it. Computer has a significant role to play in almost every field of life, e.g., education, entertainment, communication etc. With the advent of internet facility computer usage has increased many fold and people from all age groups frequently use computers for using internet. This has brought excessive use of computer at home or at workplace. Though working on computer can be enjoyable sometimes it can also have unseen effects on your health.

DO YOU KNOW?

PROPER SITTING FOR COMPUTER WORK

Lean back, raise chin and look straight

Lower back support

Elbow at 90° angle



Top of the monitor at or slightly below eye level

Thighs parallel to the floor

Feet flat on the floor



Excessive use of computer can cause some serious health problems, for example, headache and backache, pain in hand and fingers joints, vision abnormalities and eye strains. The implications for growing children are even more serious. For example, sitting for longer periods can delay physical as well as mental development of the child. Sitting in room with no social interaction with the society can hinder the interpersonal skills of the child. Many children get addicted to this habit and it becomes difficult for them to get away from the computer which in turn affects their education.

So it must be in our mind that technology has a useful role to play in our lives. But at the same time excessive use of even useful tools and machines can bring undesirable effects on our health and physical well being.

KEY POINTS

- ◆ Development and prosperity of the modern age has been accomplished by paying heavy price in the shape of environmental degradation and climatic changes which have global impacts.
- ◆ Local, regional, and global environmental issues are closely linked and their impacts affect the process of sustainable development in an area.
- ◆ Ozone layer is present in the stratosphere and it prevents harmful UV (ultra violet) radiations from entering the earth surface.
- ◆ Global warming is an increase in earth's temperature due to the effect of the greenhouse gases mainly carbon dioxide, methane, and some other gases.
- ◆ Global warming can result in melting of glaciers, flooding, climate change, droughts, diseases and increase in hurricanes frequency.
- ◆ Acid rain is rain that has a larger amount of acid in it than what is normal.
- ◆ Greenhouse effect is the rise in temperature that the Earth experiences because certain gases in the atmosphere trap energy from the sun. Without these gases, heat would escape back into space and Earth's average temperature would be lower.
- ◆ Desertification is defined as 'land degradation resulting from various factors including climatic variations and human activities'.
- ◆ Climatic change on a global scale is either due to the amount of heat that is let into the system, or the amount of heat that is let out of the system.

- ◆ Hazardous waste in the form of liquids, solids, or gases is dangerous or potentially harmful to our health and environment.
- ◆ Natural disasters are changes which are so great that they may cause damage to the shape of the land or to the lives of people and other living things.
- ◆ Natural disasters may be in the form of volcanic eruptions, earthquakes, cyclones, floods etc.
- ◆ An earthquake is a violent shaking of the ground. When tectonic plates move against each other, giant shock waves move upwards towards the surface causing earthquake.
- ◆ A storm is any disturbed state of an environment specially affecting its surface and resulting in severe weather.
- ◆ International cooperation in the form of treaties, agreements and resolutions created by intergovernmental organizations as well as national laws and regulations are being used to protect the environment.
- ◆ Pollution is the addition of unwanted and harmful materials into the environment of living things that bring undesirable changes in standard quality of an environment.
- ◆ Dependency on modern day devices is increasing and it is also increasing our chances of being affected by their negative aspects.
- ◆ Watching Television in moderation can be a good activity as television can be an excellent educator and entertainer but despite its advantages, watching too much television can be harmful too.
- ◆ Cell phone has revolutionized communication in the 21st century.
- ◆ Overuse of computers causes some physical effects in the form of eye strain, vision abnormalities, pain in hand and fingers joints, headache and backache.

EXERCISE

A. Select the correct answers in the following questions.

1. All of the following are layers of earth's atmosphere EXCEPT:
a. Troposphere
b. Lithosphere
c. Stratosphere
d. Thermosphere
2. Which one of the following causes acid rain?
a. Hydrocarbons
b. Methane
c. Halogens
d. Sulphur dioxide
3. Ultraviolet radiations from sun that reach the earth cause:
a. Respiratory disorder
b. Typhoid fever
c. Skin cancer
d. Bronchitis
4. The source of all of the following pollutants is vehicle exhaust EXCEPT:
a. Carbon mono-oxide
b. Carbon dioxide
c. CFCs
d. Nitrogen oxide
5. Which of the following is not a greenhouse gas?
a. Oxygen
b. Carbon dioxide
c. Chlorofluorocarbons
d. Methane
6. Which one of the following can cause stone cancer?
a. Carbon dioxide
b. Sulphur dioxide
c. Carbon monoxide
d. Ozone
7. Ozone layer is present in:
a. Troposphere
b. Mesosphere
c. Stratosphere
d. Thermosphere



8. The ultraviolet radiations in stratosphere are absorbed by:
 - a. Oxygen
 - b. Ozone
 - c. Sulphur dioxide
 - d. Argon
9. Most hazardous metal pollutant in the automobile exhaust is:
 - a. Lead
 - b. Mercury
 - c. Cadmium
 - d. Argon
10. Which of the following gases contribute to the greenhouse effect on earth?
 - a. Carbon dioxide
 - b. Methane
 - c. Chlorofluorocarbons
 - d. All of these
11. Which of these is NOT an expected effect of climate change?
 - a. Sea levels rising
 - b. Flooding in coastal cities
 - c. Expanding glaciers
 - d. Extreme weather
12. Based on general knowledge which natural hazard has caused the greatest number of deaths in a single event?
 - a. Earthquakes
 - b. Floods
 - c. Volcanic eruptions
 - d. Hurricanes
13. Which of the following measures an earthquake's intensity?
 - a. Richter scale
 - b. Modified Mercalli scale
 - c. Centigrade scale
 - d. Moment magnitude scale
14. Which of the following is an air pollutant?
 - a. Nitrogen
 - b. Carbon dioxide
 - c. Carbon monoxide
 - d. Oxygen

15. Which of the following is a non-point source of water pollution?

- a. Factories
- b. Sewage treatment plants
- c. Urban and suburban lands
- d. None of these

16. Taj Mahal is said to be suffering from "Marble Cancer". What is Marble Cancer?

- a. Acidic Rain which corrodes marble.
- b. Large number of Fungus in Taj Mahal marbles
- c. Yellowing of the marble on account of Soot particles
- d. Smokes entering Taj Mahal from adjoining industries

17. Water pollution is primarily caused by:

- a. Forest fires
- b. Volcanic eruptions
- c. Biological decay
- d. Human activities

B. Write short answers of the following questions.

1. Give a brief overview of the nature of ozone layer found in the atmosphere.
2. Define the term desertification.
3. List some measures to control the green house effect.
4. What are natural disasters and in which forms these are exhibited?
5. Enlist the names of different layers of atmosphere.
6. Define climate.
7. Write five major effects on environment by human activities.

C. Write in detail answers of the following questions.

1. What are the main causes of ozone depletion? List some of the major effects of ozone depletion on the living organisms.
2. Describe global warming and its consequences.
3. How acid rain is caused? What impacts this rain can have on the life of living organisms of a particular region?
4. What do you mean by Climate change? Describe some of its effects.
5. Describe natural disasters caused by El-Nino and La-Nina.
6. Identify the legislation or laws on environmental problems.
7. Describe the control strategies that can be used for treating air pollutants.
8. Describe the harmful effects of the excessive use of Television on individual's health.