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ENVIRONMENTAL DEGRADATION AND DISASTER MANAGEMENT

If you live in a village, you would have seen the trees being cut for using the land to grow crops or to construct houses. You may have also observed that small water bodies that existed some time ago are no longer seen now. If you are a resident in a city, you must have seen trees being felled for constructing houses, multiplexes and roads. We all feel the impact of air pollution owing to emission of carbon monoxide by large number of vehicles and harmful gases from factories. We come to know by reading newspapers or listening to discussions on radio or watching on television how the rivers and even the underground water sources are being polluted and the water level is going down fast. In hilly areas, forests are being cut to meet the fast growing needs of the people. Many of us are aware that all these are adversely affecting our environment. The deterioration of environment has also led to various kinds of man-made disasters and natural calamities. You may be aware of some of these like The Bhopal Gas tragedy, Tsunamis, Landslides and London Smog, and what happened regarding their management. In this lesson, therefore, we shall study the phenomenon of environmental degradation and how it is related to natural calamities, disasters and their management.



OBJECTIVES

After completing this lesson, you will be able to:

- define the terms environment and environmental degradation;
- identify various physical and biological components of environment;
- analyse various reasons for the deterioration of environment and the variety of ways in which human beings interfere with their environment;

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- infer consequences of environmental degradation;
- highlight the importance of conservation of environment;
- establish relationship between deterioration of environment and natural calamities and disasters;
- describe impacts of disaster and natural calamities on development;
- examine the role of individuals and society in protecting and maintaining the environment;
- suggest various schemes for disaster management; and
- devise various methods to manage natural calamities/disasters at local levels.

26.1 MEANAING OF ENVIRONMENT

Let us begin the discussion on environmental degradation by understanding the term 'environment' itself. What does the word 'environment' mean? Commonly environment means the surroundings in which we live. You may have read or heard terms like social environment, political environment, literary environment and school environment. But the environment which we shall discuss has a different meaning.



ACTIVITY 26.1

Based on the examples given above, can you prepare a list of any four ways in which the term **environment** is used?

In the present context, environment denotes all the elements, processes and conditions around us along with their interrelationships. It is defined as the sum total of all the conditions and circumstances and the living and non living things around an organism, which affect its life.

Let us try to understand this concept through a concrete example. You see in Fig. 26.1, a park with trees, flowers, plants, grass, butterflies, and also a couple with two children.

For the children of the couple, the environment comprises the park, trees, plants, flowers, playing equipment, air and water. There are fish in the pond. But for the fish, it is not the same. For them, environment is the surroundings within the pool. The living and non living things in the pool make the environment of the fish. Therefore, for any living organism like a human being or a plant or an animal, the environment means everything, living or non living, which surrounds it. As we find, the environment of any organism has two components, living and non-living. The living component is known as **Biotic** and includes the organisms themselves, i.e. human beings, plants, animals, other organisms, their food and their interactions. The second component



Figure 26.1 A couple playing in the park

is the non-living, known as **Abiotic** which includes such items as sunlight, soil, air, water, land, climate etc.



ACTIVITY 26.2

For a better understanding of environment based on this categorization, prepare two lists of items that are in your surroundings. In one list of the biotic component include all the things that are living and in the other list of abiotic component those things that are non-living.

26.2 CLASSIFICATION OF ENVIRONMENT

When we consult different sources of information, we find that environments can be classified in many ways based on various factors. We have seen above that environment is referred to as social environment, political environment, literary environment and school environment. These references are based on the specific contexts, social, political, literary and school. But the environment which we are trying to understand is classified on the basis of the process of its creation or evolution. Based on this, environment falls into two main categories: **natural environment** and **human-made environment**.

Natural environment: It includes all living and non-living things that occur naturally on Earth. It comprises the nature of the living space. The living space may be land or sea, that is, it may be soil or water. It also includes the chemical constituents and physical properties of the living space, the climate, and a variety of organisms. Natural environment includes both biotic and abiotic components as these have been evolved through a natural process. The creation of these components has been done by nature, and not by any human intervention or support. It is true that human beings



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live in an environment where both biotic and abiotic factors influence them and they learn to adapt themselves to these in several ways. But human beings have no role to play in the creation and evolution of natural environment.

Human-made environment: On the other hand, human-made environment includes all those things which are created by humans for their use. Human beings construct these surroundings, as these are needed for providing the required setting for human activity. These things range from the large-scale civic surroundings to personal places. For example, houses, roads, schools, hospitals, railway lines, bridges and parks are components of human-made environment.



Figure 26.2 : Classification of Environment

There is yet another kind of environment which plays an important role in the living conditions of human beings. This is called the social environment. Social environment includes cultural norms and values, the culture that individuals live in, and social, political, economic and religious institutions with which they interact.

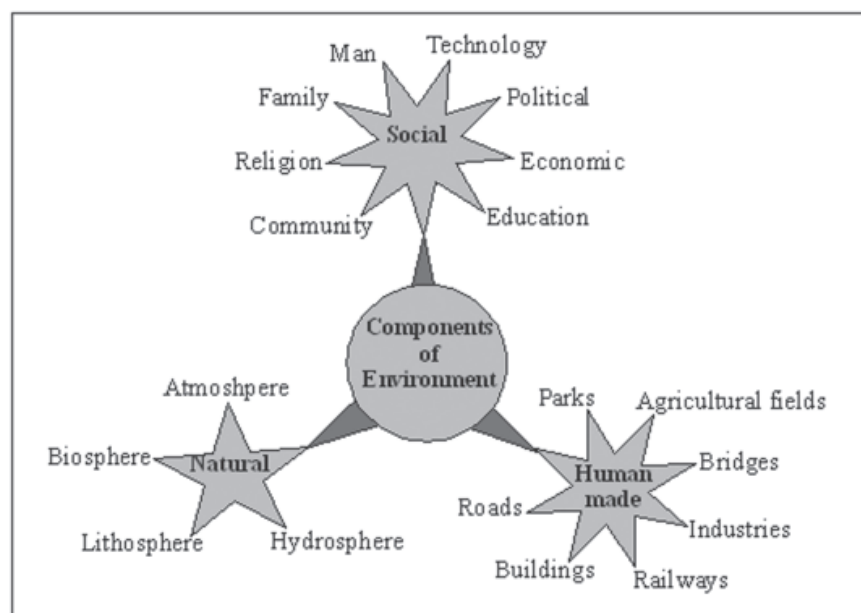


Figure 26.3 : Components of Environment



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By now we have been able to understand that normally, the environment at any place is a combination or sum total of the natural component and the human-made component. For example, in a town or city the people and animals living in it, the land, air, water and trees are the components of the natural environment, whereas the buildings, roads, other structures like schools, hospitals and establishments for water and electricity supplies are the components of the human-made environment. As you may observe, human beings use natural environment for creating human-made environment.

26.3 THE DYNAMISM AND THE VARIETY OF THE ENVIRONMENT

As you yourself observe and find that the environment is never static. One of its most significant characteristics is its dynamism. It is continuously changing. Both the biotic and the abiotic elements in the environment are dynamic by their nature. Let us understand what is this dynamism and how it works. The environment differs from place to place and also from one time in history to another. For example, the environment of the Himalayas is different from that of the Great Indian Desert, and even there it is not the same over the years and decades. Climatic conditions change in different places in different seasons. If you observe the evolution of the environment of the same place, say over a period of 20 or 30 years, you will find that the environment of that place has changed. Some changes take place naturally, while others are caused by the activities of human beings.

Even the human-made environment has been undergoing changes over a period of time and space. There have been notable changes in human dwellings. The skyscrapers that you see today in many cities were not present about 20 years ago. A number of villages have developed into towns, cities and mega-cities. Means of transport and communications have been revolutionized. All these changes and developments show the dynamic nature of environment. Observe, think and understand the kinds of changes that have taken place within the last couple of years in the human-made environment in the city or village where you live. Aren't the changes very noticeable?

The environment is dynamic in nature and keeps on changing.



INTEXT QUESTIONS 26.1

1. Put the following into biotic and abiotic groups:

Plants, Water, Soil, Animals, Fire, Microbes, Topography, Bacteria.

Biotic	Abiotic

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2. Fill in the blanks with appropriate words:
 - (a) Environment can be classified into and
 - (b) The classification of environment can also be made on the basis of its
 - (c) Road, buildings and school are parts of environment.
 - (d) Environment is dynamic because
3. Activity - Make a list of things around you and classify them into two categories. In the first category mention those things that are essential for your living and in the second category put those things that you can live without.

26.4 IMPORTANCE OF ENVIRONMENT

We always say that environment is key to our welfare and survival. Have you ever thought why it is said so? The environment is our life support system. In fact, it affects and influences the growth, development, and survival of all organisms, including human beings. All kinds of our needs are met by the environment. It supplies the basic necessities for life and supports large number of life forms. We are dependent on the environment for our food, shelter, water, air, soil, energy, medicines, fibers, raw materials, and many other things. The environment maintains atmospheric composition and protects all kinds of life on earth from harmful effects of solar radiation. But in spite of all these benefits we find that the quality of environment is deteriorating and it is being degraded continuously. It is not only that the resources of the environment are being irrationally utilised, we are contributing dangerously to its pollution.



Do you know

Environmental degradation is one of the *ten threats* officially cautioned by the High Level Threat Panel of the United Nations. The World Resources Institute (WRI), the United Nations Environment Programme (UNEP), the United Nations Development Programme (UNDP) and the World Bank made public an important report on health and the environment worldwide on May 1, 1998.

26.5 ENVIRONMENTAL DEGRADATION

What is environmental degradation? Let us understand it. It is the process by which our environment i.e., air, water and land, is progressively contaminated, over-exploited and destroyed. When the environment becomes less valuable or damaged, environmental degradation is said to occur. In specific term, environmental degradation is the deterioration of the environment through depletion of resources such as air,

water, soil and forest; the destruction of eco-systems and the extinction of wildlife. Let us recall our experiences in daily life. We are utilizing resources like water, soil, trees, coal, petrol without caring for the future. We are carelessly interfering with the eco-system and deliberately killing wild animals. In fact, there are many forms of environmental degradation. Whenever habitats are destroyed, biodiversity is lost, or natural resources are depleted, the environment is hurt.

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26.6 CAUSES OF ENVIRONMENTAL DEGRADATION

Based on the discussion so far, we now know that healthy environment is essential for the very existence of human society and other living organisms. But environmental degradation is going on unabated. We are being cautioned every now and then about the deterioration in the environment and its consequences like global warming, changing climatic conditions, impending water crisis, decreasing fertility of agricultural land and increasing health problems. There is an urgent need to take all possible steps to check environmental degradation. In order to consider the required steps to be taken for doing so, it is necessary to understand the causes of environmental degradation. The important factors are the following:

Social Factors

Growing Population: Population is the greatest resource of any country and a major contributory factor for development, and yet it is a major cause of environmental degradation. As we find, the rapid pace of population growth has led to the excessive utilization of natural resources. Huge population also leads to huge production of wastes. The resultant outcomes are loss of biodiversity, pollution of air, water and soil and increased pressure on arable land. All these have been putting great stress on the environment. If you take the case of India, it supports 17 percent of world population on just 2.4 per cent of the world land area.



Poverty: Poverty is said to be both the cause and effect of environmental degradation. You may have seen that the poor people use natural resources more than the rich. They use these for building their huts, for cooking, for their food and for meeting many other needs. In this way they deplete these resources faster as they have no opportunity of gaining access to other types of resources that are



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primarily exploited by the rich. As we know, the more the resources are utilized, the more degraded the environment becomes. And the more the environment deteriorates, the more impoverished the poor will be.

Urbanisation: You may have observed a large number of poor people from villages moving to towns, cities and mega cities to earn their livelihood. This has led to unplanned and rapid expansion of cities, creating enormous pressure on the infrastructural facilities. If you live in a city, you may be experiencing these pressures on housing, water and electric supply and sewage. You would be aware of the growing slums. Urban slums are major sources of pollution and suffer from the worst kind of unhygienic conditions. The fast pace of urbanisation has also been responsible for the depletion of forests and irrational use of other resources.



Changing Life Style: There has been a remarkable change in the style of living of people. This change is visible not only among the people living in cities and towns but also among those who live in villages. The changing life style of people has enormously increased their level of consumption. It has also resulted in the increase of human activities that are causing serious damage to environment in many ways. It has contributed to air, water, sound, vehicular and industrial pollution. The fallout of the fast increasing use of modern gadgets like refrigerators and air conditioners is the release of harmful gases in the atmosphere. This has been causing global warming which is very dangerous. In fact, due to overuse of modern gadgets, harmful gases like carbon monoxide and carbon dioxide are released which lead to global warming.



Do you know

Chlorofluoro Carbon (CFC): It is an inert lifeless gas. But when it comes into contact with other gases, it becomes harmful. It is responsible for depletion of the ozone layer.

Economic Factors

Agricultural Development: Agricultural development is so important for a country like ours. But this has been affecting the environment adversely. Various kinds of

farming activities especially directed towards increasing agricultural production have a direct impact on environment. These activities have been contributing to soil erosion, land salination, alkalization and loss of nutrients. As we have been experiencing in India, the green revolution has led to over exploitation of land and water resources. Extensive use of fertilizers and pesticides has been a major source of contamination of water bodies and land degradation.



Industrialization: Rapid industrialization has been the foremost contributor to environmental degradation. Based on the information collected through various sources, we find that most of the industries adopt the technologies that place a heavy load on environment. These technologies lead to intensive use of resources and energy. The current pace of industrialization therefore is resulting in the depletion of natural resources like fossil fuel, minerals and timber, and contamination of water, air and land. All these are causing immense damage to ecosystems and leading to health hazards.



Economic Development: It is a fact that the pattern of economic development has also been creating environmental problems. The pace of economic development has been putting immense pressure on resources. The economy today has become consumption intensive which demands greater use of resources and promotes life styles that lead to wastage. The irrational use of resources and wastages are resulting in depletion of environment.

**ACTIVITY 26.3**

Some important causes of environmental degradation have been discussed above. But there are some other causes also, such as deforestation, mining activities, automobiles, industrial effluents, generation of too much waste (Garbage), dumping of hazardous radio-active wastes, spilling of oil, construction of larger dams and reservoirs.

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You may collect information from different sources like books and magazines and prepare brief notes on each of the causes, explaining how these damage the environment.

26.7 IMPLICATIONS OF ENVIRONMENTAL DEGRADATION

The degradation of environment is thus a very serious concern. And it is occurring primarily due to excessive and reckless exploitation and unscientific management of natural resources. In fact, it has emerged as a global challenge for all the countries of the world. As stated above, the pollution of air, water and soil caused by emission of harmful gases, release of industrial effluents, urban wastes and radio-active wastes and reckless use of fertilizers and pesticides is threatening the very survival of modern civilization. If you go through the facts stated in the following box, you may realize the seriousness of environmental degradation.

Think and Ponder

- About 50 percent of geographical area of India suffers from varying degrees of degradation caused by deforestation, overgrazing, agricultural mismanagement, shifting cultivation, soil erosion, soil salination, water logging, alkalinity, and acid rains.
- Over 5.3 billion tonnes of top soil is lost every year due to soil erosion. The average soil loss is estimated to be over 16 tonnes per hectares per year which translates into approximately 1 millimetre (mm) each year or 1 centimetre (cm) every decade. It takes nature about a thousand years to form one cm of soil.
- The production of cereals will drop remarkably due to global warming. Scientist around the world are getting increasingly alarmed over global warming's impact on human health. Warming climate is responsible for spread of serious infectious diseases.
- Increasing temperatures are lengthening the growing season of some crops.
- Himalayan glaciers are melting. The rivers originating in Himalayas will get dried.
- Westerly winds have been disrupted this year (2009) causing less rain during the winter season.

One of the major causes of environmental degradation is generation of solid wastes. Do you know that, all over the world people throw away 1000 million tons of solid wastes annually? If we pile up all these at sea level in the shape of a cone, a pyramid with circular base of one kilometer region, its peak would be higher than Mount



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Everest. So we are creating at least one Mount Everest of rubbish materials every year. We can save our environment from degradation and at the same time create wealth in three ways: Recycling, Reusing and Reducing, as detailed in the box below:

Recycle		Reuse		Reduce consumption	
What to recycle	Its Impact	What to reuse	How	What to reduce	How
Organic waste such as banana peels, egg shells and leftovers of vegetables	It will enrich soil	Cans/ Tins	Use as Pencil Holder	Plastic	Use cloth bag for shopping and say no to plastic bags
Paper	Trees will be saved from being cut	Paper	Make rough pads out of remaining unused paper	Electricity	Switch off lights and fans when you leave a room
Aluminum	It will reduce need for more bauxite	Cloth	Use as Carpet Sheets	Water	Close taps when water is not being used and store only the needed amount of water



Recycle	Reuse	Reduce
Organic waste such as banana peels, egg shells and leftovers of vegetable Enrich soil	Cans/tins Pencil holder	Plastic Use cloth bag for shopping
Paper save trees	Paper Make rough pads out of remaining unused paper	Electricity Switch off lights and fans when you leave a room

Figure 26.4 : Saving the Environment

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What can you do?

- You can use and promote eco friendly and biodegradable products.
- You can segregate your Home garbage to facilitate the recycling process.
- You can refuse products with plastic packing and depend on more traditional packing material like paper and cloth.
- You can demand eco-friendly refrigerators and air conditioning systems which do not use CFC's

26.8 SUSTAINABLE DEVELOPMENT

Because of the serious consequences of environmental degradation, it has been a matter of great concern. Very often it is linked with development. There is a strongly expressed point of view that the major reason of environmental degradation has been the model of development adopted by human society. The concept of sustainable development has emerged as an alternative model that will halt environmental degradation. Although sustainable development has been used in a number of contexts with different meanings, it has a particular meaning in the context of environment and development relationships.

It is defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. In this context it is necessary to eliminate irrational use of natural resources that causes environmental depletion. Sustainability requires managing the needs of development in a way that ensures that the economy and society continue to exist without destroying the natural environment on which we depend. We can achieve the goal of sustainable development by managing the scientific use of our natural resources.

26.9 DISASTER MANAGEMENT

Environmental degradation has still more serious implications. Do you know that around the world a growing share of devastation triggered by disaster stems from environmental degradation and resource mismanagement? Disasters have become one of the greatest challenges, but they can be managed.

We may better understand disaster management by understanding the term disaster. A **disaster** is the tragedy that negatively affects society and environment. Disasters are seen as the consequence of inappropriately managed risks. These can be classified into two categories based on their origin: Natural Disasters and Human-made Disasters. A natural disaster occurs when a natural hazard (e.g., volcanic eruption or earthquake or flood) affects human life. Disasters caused by human action, such as negligence, error, or by the failure of a system are called human-made disasters. Examples of such disasters are: Bhopal Gas Tragedy, Landslides that take place in different parts of our country or Floods due to breaches in dams. Global

Warming is going to be a great disaster, and it is also the result of human interference with the natural environment.

Although the consequences of a disaster are immense, its impact can be minimized. Minimizing the adverse effects of natural and human-made disasters by adopting suitable strategies is called **disaster management**. Its process involves four phases: mitigation, preparedness, response, and recovery.

Mitigation

Mitigation may appear to you as a technical or difficult term. It means the efforts that are made to prevent hazards from developing into disasters, or to reduce the effects of disasters to the minimum, when they occur. The mitigation phase differs from the other phases because it focuses on long-term measures for reducing or eliminating risks. Even before the phase of mitigation, there may be a phase of the identification of risks. It is better to identify the risks before you plan and make efforts to reduce the impact of disaster. For example, during rainy season, there may be the possibility of flood in a river. If the possible damage to be caused by the flood is identified, one may plan and take steps to reduce the damage.

Preparedness

In the preparedness phase, disaster managers develop plans of action for when the disaster strikes. This includes (a) communication plans with easily understandable terminology and methods; (b) proper maintenance and training of emergency services; (c) development of emergency shelters and evacuation plans; (d) getting ready and maintaining disaster supplies and equipment; and (e) developing organizations of trained volunteers among civilian populations.

Response

When a disaster occurs, actions under the response phase are taken. These include the mobilization of the necessary emergency services and also of people who respond immediately in the disaster area. This is likely to include emergency services, such as firefighters, police and ambulance crews. A well planned strategy as part of the preparedness phase enables efficient coordination of rescue.

Recovery

The aim of the recovery phase is to restore the affected area to its previous state. It differs from the response phase in its focus. Recovery efforts are primarily concerned with actions that involve rebuilding destroyed property, re-employment, and the repair of essential infrastructure.

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ACTIVITY 26.4

Earthquakes, tsunamis, landslides, drought, floods and cyclones are the six major disasters which take a heavy toll on the life and property all over the globe. Can you prepare a disaster management plan in respect of any one of these for all the four phases: mitigation, preparedness, response and recovery, based on the processes discussed above?



INTEXT QUESTIONS 26.2

- Fill in the blanks with appropriate words.
 - When habitats are destroyed is lost.
 - Modern gadgets release and causes
 - Extensive use of fertilizers and pesticides have been a major source of and
 - One of the biggest causes of environmental degradation is generation of
- What is disaster? Give any one example.
- Activity: Garbage survey

For waste management, it is necessary that we collect the wastes for disposing them off in three ways and take the needed steps, i.e. recycle or reuse or reduce them. In this context you have to observe what type of waste is disposed of in your house/area/colony? Carry out a weekly survey in your house/area/locality in the following format and write which of the wastes can be recycled, reused or reduced:

Day	Recycle	Reuse	Reduce
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			



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Write in the above table the names of garbage generated in your house on each day of the week. After one week, see which type of garbage is generated the most. Try to reuse or reduce as explained in the lesson above. Do the same exercise for another week and compare the results of two weeks. You may find that the garbage under 'Reduce' has decreased substantially.

4. List the activities by which we degrade the environment.

1	Using and throwing plastic materials into drains.
2	Plucking leaves from plants or trees while standing at the bus stop.
3	
4	
5	
6	
7	
8	
9	
10	



WHAT YOU HAVE LEARNT

- The word environment denotes all the elements, processes and conditions around us along with their interrelationships. It is defined as the sum total of all the conditions and influences that affect the development of life of an organism. Environment has two components namely biotic and abiotic. Based on the process of creation or evolution, environment can be classified into two main categories, i.e. Natural and Human-made environment. The environment does not remain static but it keeps on changing according to place and time. Both natural and human-made environments are dynamic in nature; you must have noticed the changes in human-made environment. Environment is very vital for us. We are dependent on our environment for food, shelter, water, air, soil and energy, fibers, medicines, raw materials and so on. In spite of such importance of environment, we are degrading it in the name of development. Social and economic factors such as growing population, poverty, urbanisation, changing life style, agricultural development, economic development and industrialization are major causes of environmental degradation. We should try to conserve our environment by observing certain simple rules and norms.
- Disasters like floods and droughts are caused by environmental degradation and mismanagement of resources. Disasters can be divided into two categories –

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natural and human made. Disaster management is a series of activities in four phases. These are mitigation, preparedness, response and recovery. Though natural disasters cannot be stopped but their effects can be minimized by us.



TERMINAL EXERCISES

1. What is meant by environment? Explain it with the help of an example.
2. Classify environment on the basis of evolution. Explain them with examples from your surroundings.
3. 'Environment is dynamic in nature and keeps on changing.' Substantiate this statement with examples.
4. Discuss in brief the importance of environment.
5. Define environmental degradation. Explain the factors causing environmental degradation.
6. Suggest any three ways to save our environment from degradation.
7. List at least ten activities by which human beings have been degrading the environment.
8. Classify disasters on the basis of their origin.
9. What is meant by disaster management? How can we minimize the adverse effects of disasters?



ANSWERS TO INTEXT QUESTIONS

26.1

1. Biotic – Plants, animals, microbes, bacteria
Abiotic – water, soil, fire, topography
2. (a) Natural, human made
(b) Creation or its evolution.
(c) Human made
(d) It changes over a period of time and space.
3. The child will write the names of biotic and abiotic components of the environment of his own area/locality.

For example water without which nobody can live. He/she will prepare the list of other things himself/herself.



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26.2

1. (a) Biodiversity
(b) Harmful gases, global warming
(c) Contamination of water bodies, land degradation
(d) Solid wastes
2. A disaster is the tragedy that negatively affects society and environment. Example Bhopal gas tragedy, Tsunamis, Landshides, London Smong, floods, earthquakes (Any one)
3. The students have to conduct this survey themselves.
4. He has to write the activities himself.

Hints for Activity

26.1

Learning objective	Assessment tool	Scoring key
Identify various components of environment	Experiential learning	Level -1 (Marks -0 to 3% – insufficient response) The child will be able to answer only one way in which the environment is used.
		Level -2 (Marks 34-55% – Improvement required) The child will be able to answer two ways in which the term environment is used.
		Level -3 (Marks 56-75% – more or less satisfactory) The child will be able to tell about three ways.
		Level 4 (76-100% and above – Very good) The child will be able to tell all the four ways in which the term environment is used.