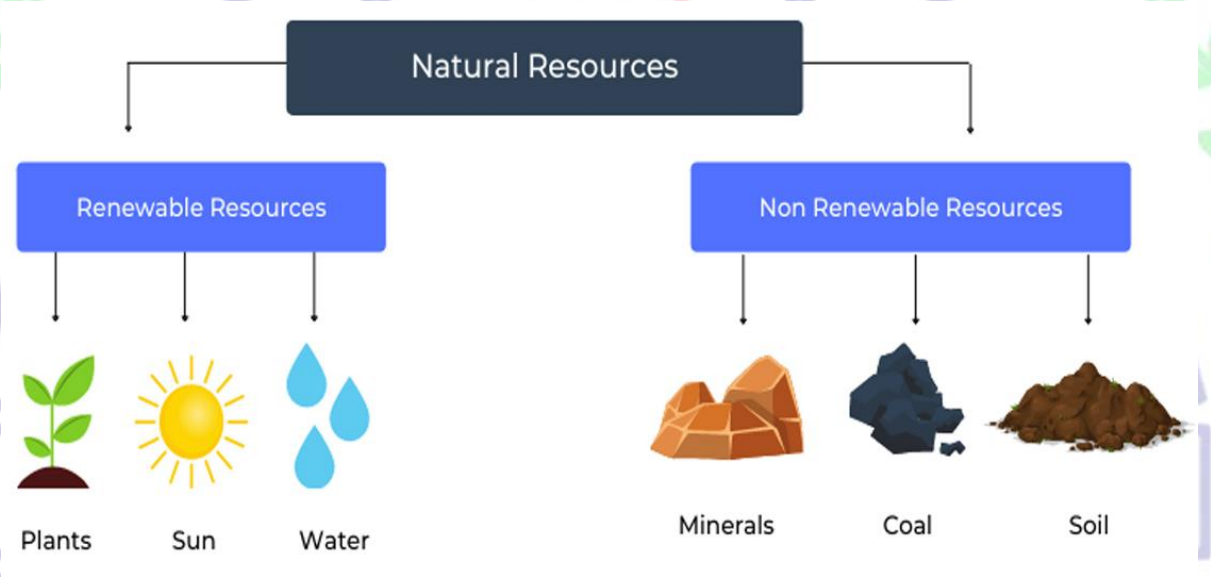
BIOLOGY

Chapter 14: Natural Resources

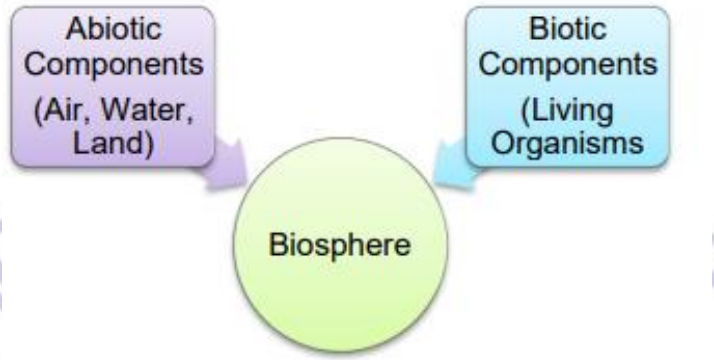
Natural Resources

- **Natural resources** are substances found in nature which can be used by human beings to fulfil their necessities.



- The biosphere is the region of the Earth where the lithosphere, hydrosphere and atmosphere interact, making life on Earth possible.

Physical Divisions of the Biosphere	Description
Lithosphere	• Outer crust of the Earth. • Also known as land. • Its upper weathered part forms soil.
Hydrosphere	• Water component of the Earth—water present on the Earth's surface and underground. • 75% of the Earth's surface is occupied by water.
Atmosphere	• Blanket of air which covers the Earth is called the atmosphere.



Air

Air is a mixture of gases such as nitrogen, oxygen, carbon dioxide, other gases and water vapour.

Eukaryotes and prokaryotes use oxygen to break down glucose and release carbon dioxide.	Human activities such as combustion of coal and burning of fuel use oxygen and release carbon dioxide.

The amount of carbon dioxide in the atmosphere is very low and it is maintained in two ways:

Green plants convert carbon dioxide into glucose in the presence of sunlight.	Marine animals use carbonates dissolved in seawater to make their shells.

Significance of the Atmosphere

A. Role of the Atmosphere in Climate Control

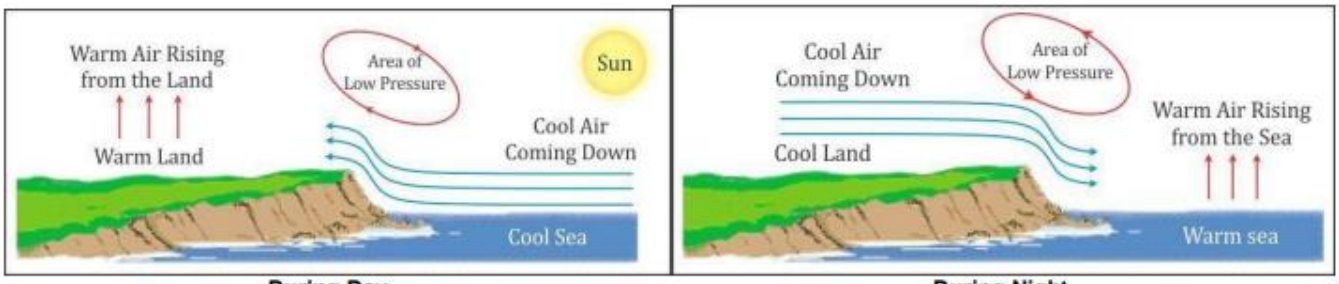
- Air is a bad conductor of heat.
- It keeps the average temperature of the Earth steady during the day and throughout the whole year.
- The atmosphere prevents sudden increase in temperature during daylight hours.
- During the night, the atmosphere slows down the escape of heat into space.
- The Moon does not have an atmosphere. The temperature on the Moon ranges between –190°C and 110°C. In the daytime, the temperature rises to 110°C, and at night, it cools down to –190°C.

B. Winds: Movement of Air

- The movement of air from one region to another creates wind.

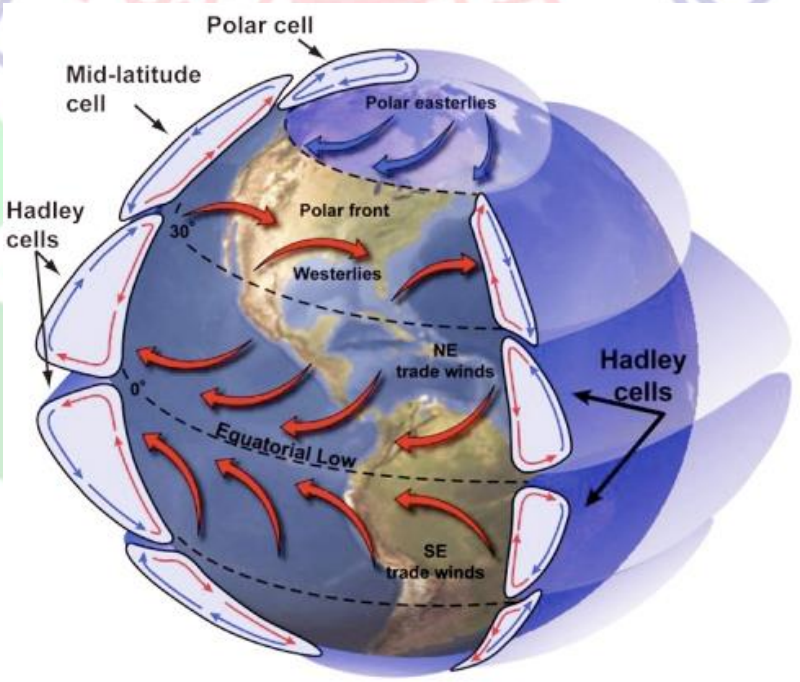
Air Movement in Coastal Areas

- In daytime, there is a regular flow of cool air from the sea towards the land, while during the night, air starts flowing from the land towards the sea.



During Day During Night

Wind Belts



- Temperature differences across the Earth develop major **wind belts**.
- These wind belts define the climate zones of the world.

Factors Influencing Movements of Air

1. Uneven heating of land at different regions of the Earth
2. Differences in heating and cooling of land and water bodies
3. Vaporisation and condensation of water vapour
4. Rotation of the Earth
5. Presence of mountain ranges in the path of wind
6. Differences in topography over which wind passes

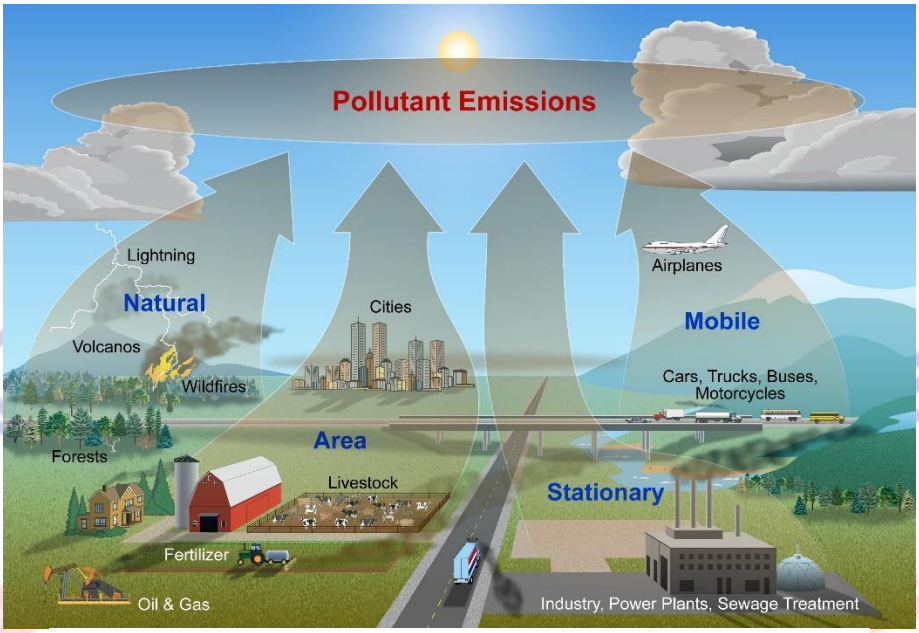
C. Rain

- A large amount of water evaporates into the air when the water bodies get heated because of solar radiations.
- The air carrying water vapour gets heated and rises, expands and cools forming clouds.
- As more condensation occurs, the droplets grow and become heavy, and they fall in the form of rain.
- When the temperature of air is very low, precipitation occurs in the form of snow, hail or sleet.

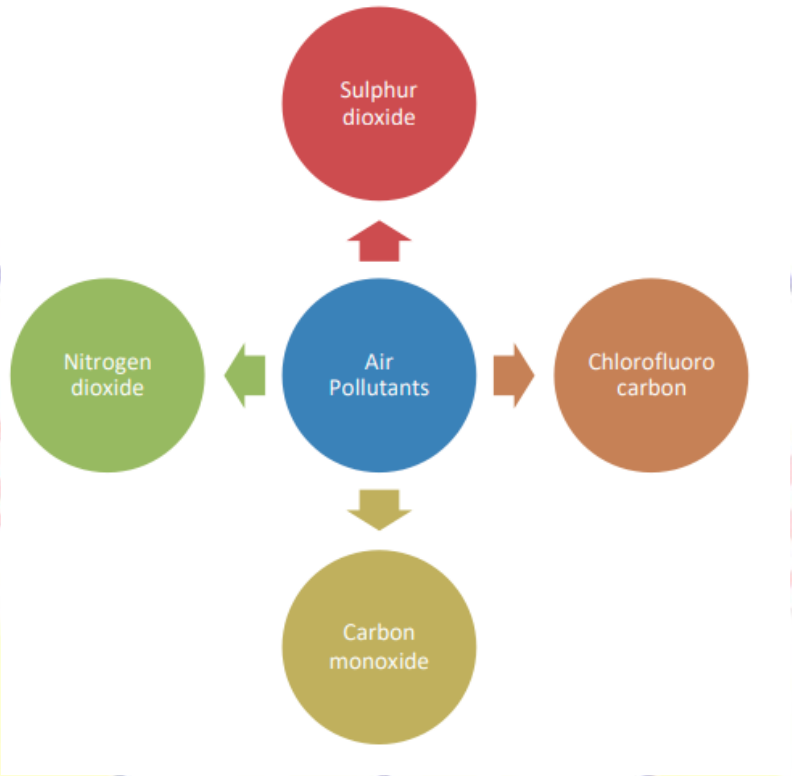
Rainfall Pattern

- Prevailing wind patterns decide rainfall patterns.
- In large parts of India, the rainfall is brought by the south-west or north-east monsoons.

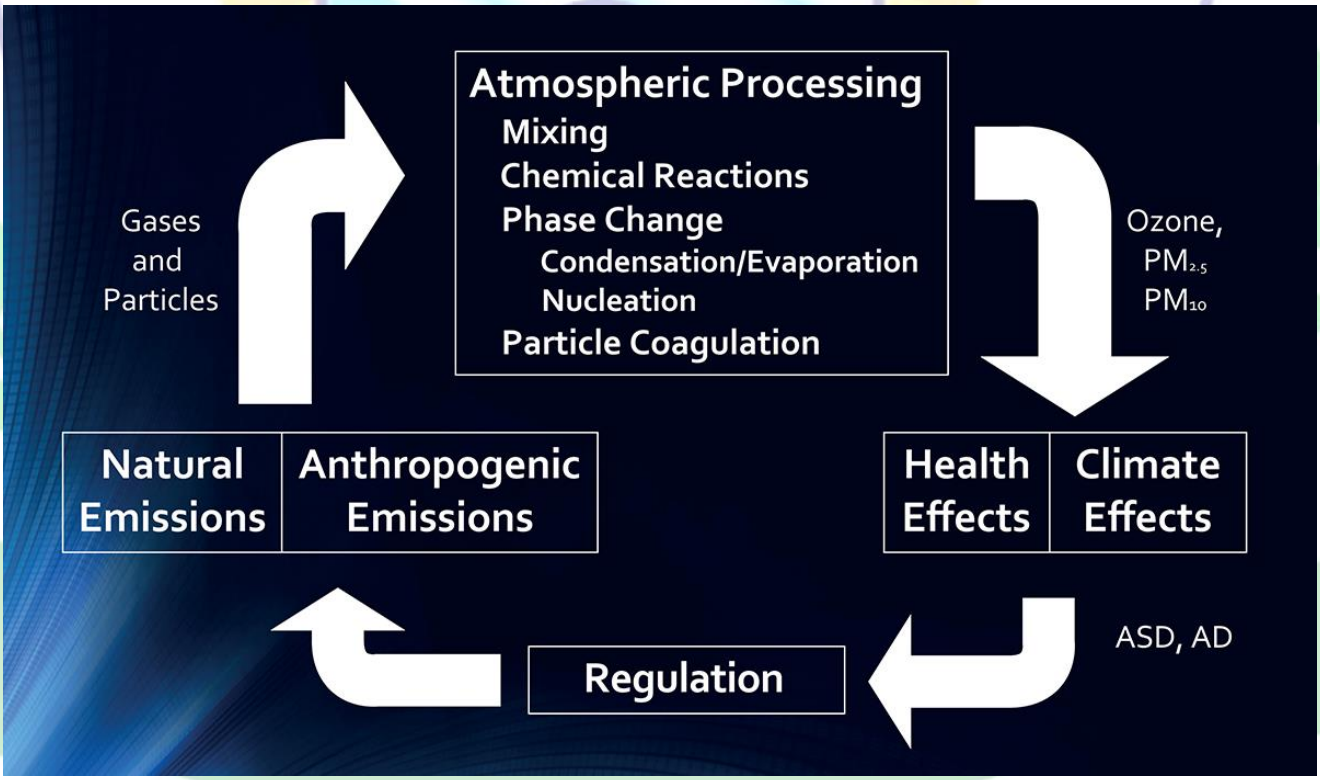
D. Air Pollution Sources



Some Major Pollutants



Effects of Air Pollution



Oxides of sulphur and nitrogen react with rain water and result in acid rain.

Suspended particles of pollutants react with heat and sunlight causing low visibility, i.e. smog.

Increased concentration of greenhouse gases such as CO_2 in the atmosphere prevents escape of heat from the Earth into space leading to global warming.

Release of CFC through air conditioners and refrigerators causes ozone depletion which may cause skin cancer and skin diseases.

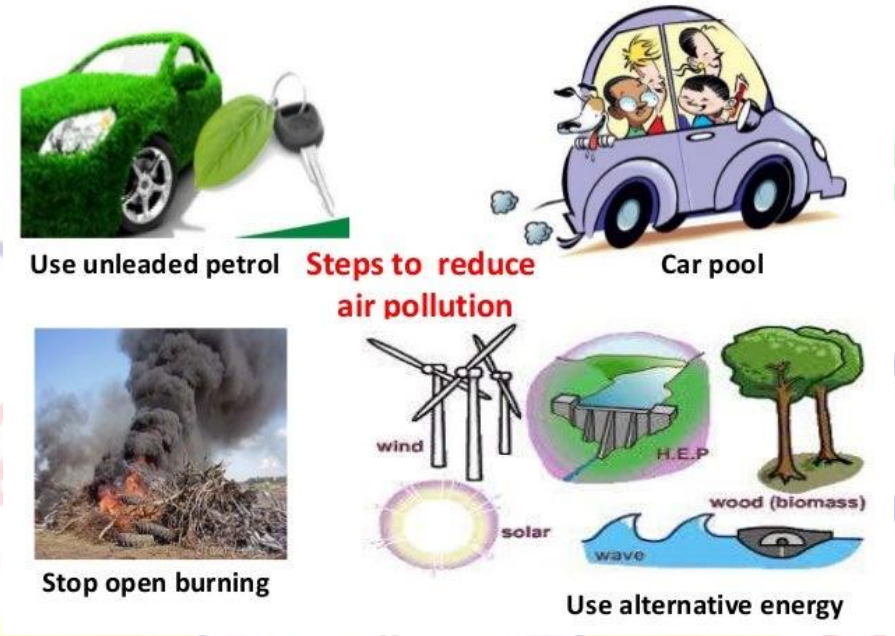
DID YOU **KNOW** ?

16 September is celebrated as 'International Ozone Day'.

FACT !

In 1952, approximately 12,000 people died in the London smog episode.

Prevention of Air Pollution

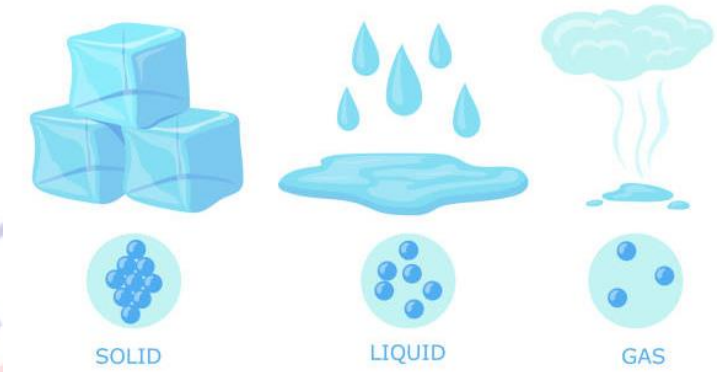


• Minimise the use of fuels such as petrol and diesel. Use a cleaner source such as compressed natural gas (CNG).
• Regular emission testing for vehicles (e.g. PUC test for automobiles).
• Industries must have tall chimneys with electrostatic precipitators and filters.
• Garbage and plastics should not be burnt.
• Nuclear wastes should be disposed of safely.
• Fines and penalties should be enforced for those who break laws amended to control air pollution.

Water

Water is inexhaustible and the most important resource on the Earth.

Forms of water



Water vapour in the atmosphere

Saline water found in seas and oceans

Fresh water found in frozen ice caps and glaciers, rivers, lakes, streams, ponds and groundwater

Surface water found in rivers, lakes, streams and ponds

- When rain falls, water percolates into the ground through soil particles which is called **groundwater**.

Significance of Water

Water is essential for the maintenance of life.

It plays an important role in the formation of soil.

It is a living medium for many organisms.

Humans use water for drinking, washing utensils and clothes, sewage disposal, agriculture etc.

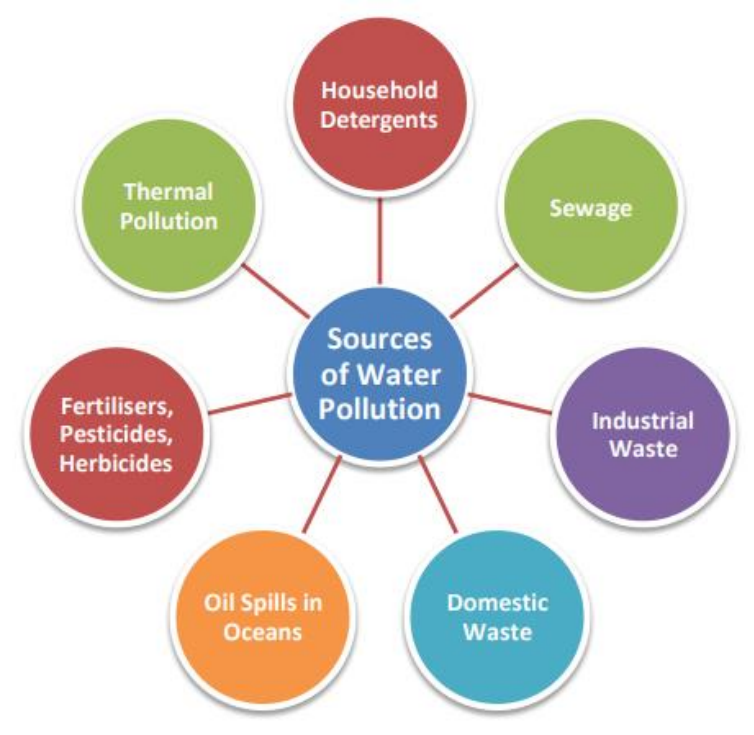
All cellular processes and metabolic reactions require water.

Water is the medium through which substances are transported within the body.

Water Pollution

Water pollution is the contamination of water sources such as rivers, lakes, oceans and groundwater.

Sources of Water Pollution



Effects of Water Pollution

- Polluted water becomes unsuitable for drinking and for other uses.
- Toxic substances enter the food chains and get concentrated at each successive trophic level in the food chain. This is called biomagnification.
- Sewage carries disease-producing microorganisms which may cause water borne diseases such as cholera, dysentery, jaundice, typhoid, diarrhoea etc.
- Microorganisms present in polluted water depletes its oxygen content resulting in the death of aquatic organisms.
- Mixing of fertilisers in water sources cause algal growth called eutrophication which results in less oxygen supply to aquatic organisms resulting in their death.
- Oil spills result in choking of the respiratory system of organisms causing their death.

Prevention of Water Pollution

Sewage, industrial waste and domestic waste should be treated to make them harmless before they are released into water bodies.
Use of chemical pesticides must be minimised.
Use of biofertilisers should be encouraged.
Washing of utensils and clothes and bathing of cattle in water bodies must be avoided.
Garbage and other domestic waste should not be thrown in water bodies.
Leakage of drainage pipes must be prevented.
Awareness must be created among students and adults about the severity of water pollution.
Laws should be formulated to control water pollution. Penalties should be enforced for those who break the law.

Soil

Soil is the part of the Earth's crust which consists of disintegrated rocks and decaying organic matter. When soil loses its plant cover, it is exposed to wind and rain. It gets blown away or washed away rapidly. This condition is known as **soil erosion**.

Formation of Soil

1. The Sun	• Rocks expand because of heat energy from the Sun. • At night, rocks cool down and contract. • Expansion and contraction of rocks are not simultaneous which results in the formation of cracks in the rocks. • When the cracks grow further, rocks break into small pieces.
2. Water	• Water gets filled in the cracks present in rocks. • At low temperature, this water freezes and expands. • Expansion of water widens the cracks in rocks. • Flowing water wears away the ground surface over which it is flowing. • Fast-flowing water always carries small pieces of rocks. • These small rocks, or pebbles, rub against rock surfaces gradually causing soil to form from the rocks.
3. Wind	• Strong winds strike the surface of rocks and erode or break them.
4. Biological Weatherig	• Lichens grow on rock surfaces and extract minerals. • This creates crevices on rocks in which a thin layer of soil gets filled. • Mosses grow on this soil. • They deepen the crevices, and cracks are formed.
	• Roots of plants grow deep in the ground in search of nutrients and water. • As the roots grow, they form cracks in the rocks and eventually break them.

Soil Profile

A soil profile represents the vertical section of the Earth's crust.

It is made of horizontal layers of soil which vary in thickness, colour, texture, porosity and composition.

- The topmost layer of the soil which contains humus and living organisms is called the **topsoil**.
- Humus is a major factor which decides the structure of the soil.
- Humus makes the soil more porous and aerated, and increases its water-holding capacity.

Soil Pollution

The contamination of soil which reduces its quality and fertility is called soil pollution.

Sources of Soil Pollution

Effects of Soil Pollution

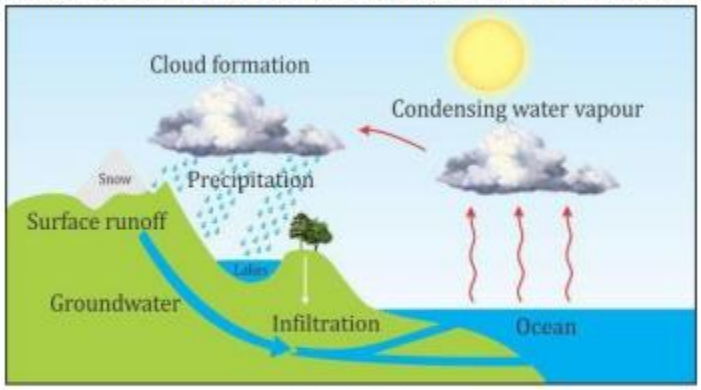
Pesticides such DDT enter food chains and affect organisms at each trophic level.

Chemicals present in liquid waste acumulates in the soil and reduces the soil fertility.

Agricultural waste becomes a breeding ground for organisms which may harm the crops.

Prevention of Soil Pollution

Avoid overuse of pesticides and fertilisers. Use of biofertilisers must be encouraged.

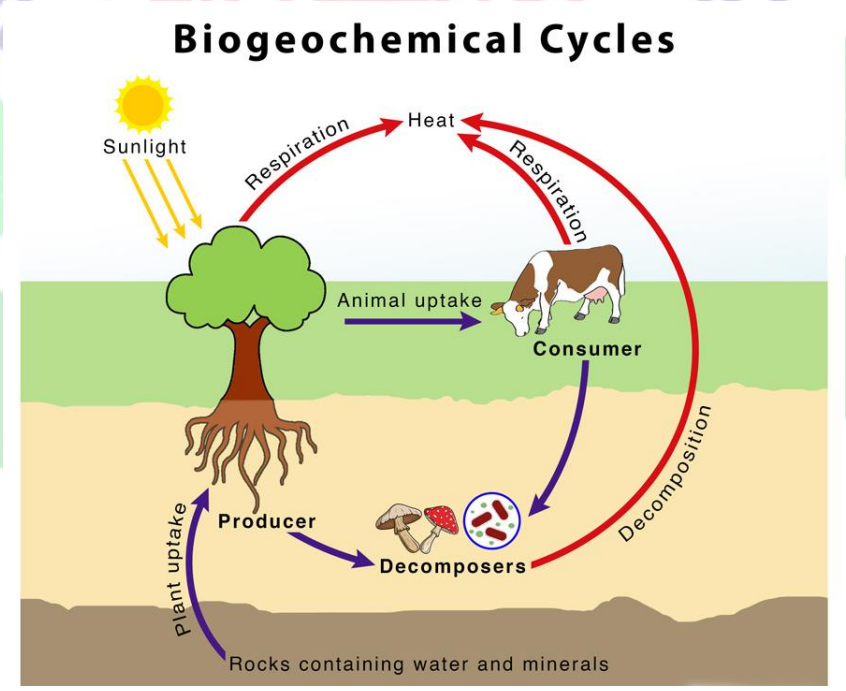


Water cycle

Plastic bags, glass and metal cans must be recycled.

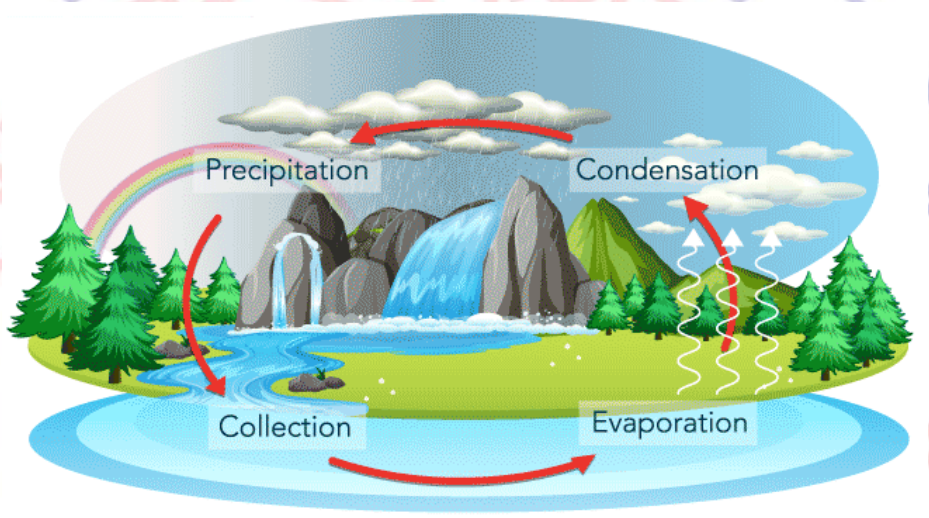
Plant and animal waste can be converted into manure.

Biogeochemical Cycle



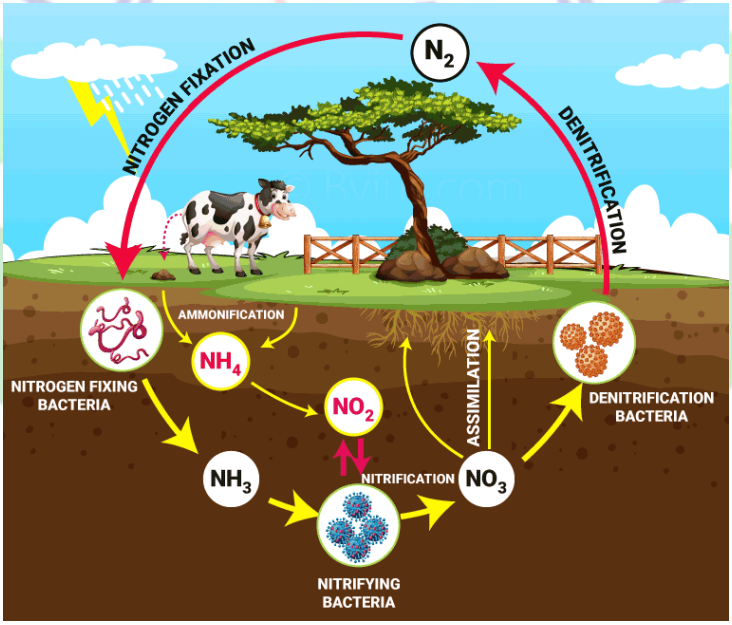
Biotic and abiotic components interact with each other to form a stable system.
Living organisms require various nutrients for their growth and metabolism which are derived from the lithosphere. These nutrients are called biogeochemicals.
The biogeochemicals are constantly recycled between biotic and abiotic components. This circulation of biogeochemicals in the biosphere is called a biogeochemical cycle.

A. Water Cycle



- There is constant exchange of water between the air, land and sea.
- The exchange of water also occurs between living organisms and their environment.
- During the water cycle, water gets evaporated from water bodies and falls on the Earth in the form of rain.
- Some water becomes part of the groundwater reservoir, some amount of water becomes part of the springs, some is used by living beings and some meets the sea through rivers.

B. Nitrogen Cycle

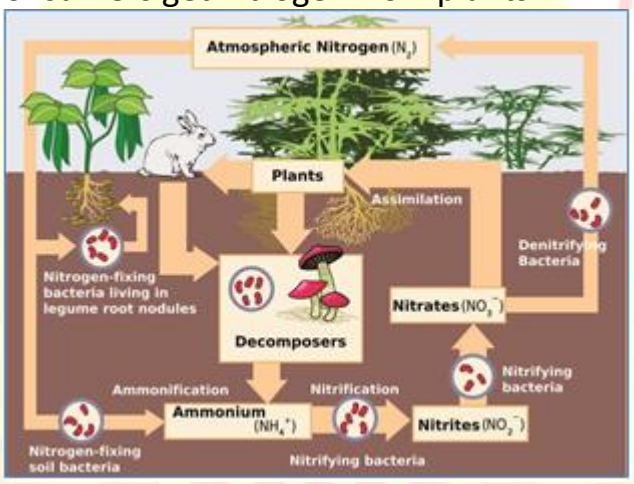


- Nitrogen is an important nutrient present in proteins, amino acids and nucleic acids.
- Although nitrogen is required by living organisms, it cannot be used when available in its free state.
- Nitrogen is converted into a usable form by the process of **nitrogen fixation**.

Nitrogen Fixation

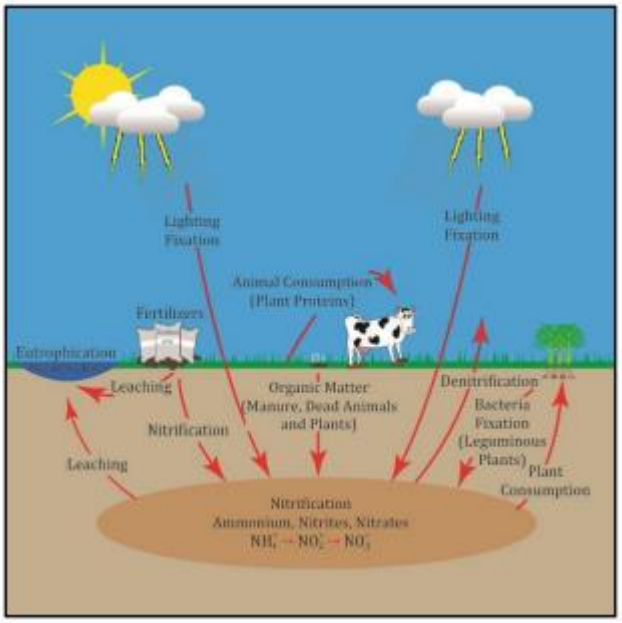
Biological Process

- Nitrogen-fixing bacteria convert atmospheric nitrogen into nitrites and nitrates which are used by plants.
- Secondary and tertiary consumers get nitrogen from plants.



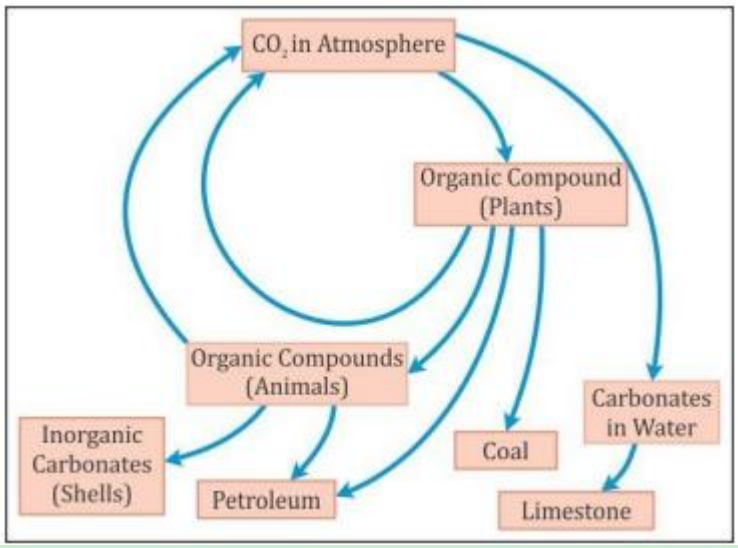
Physical Process

- During lightning, atmospheric nitrogen react with oxygen and forms dilute nitric acid.
- This nitric acid comes down to the Earth during rainfall.
- Plants use nitric acid to form nitrates, which are further used to synthesise proteins.
- When plants and animals die or when animals excrete urea and uric acid, certain bacteria carry out ammonification.
- Plants can assimilate these ammonium ions, or bacteria further convert them into nitrate ions by nitrification.
- Some bacteria, such as pseudomonas, convert nitrates into nitrogen, ammonia or oxides of nitrogen. This process is called denitrification.
- Free nitrogen is released in the atmosphere, while oxides are used up by plants.



Carbon Cycle

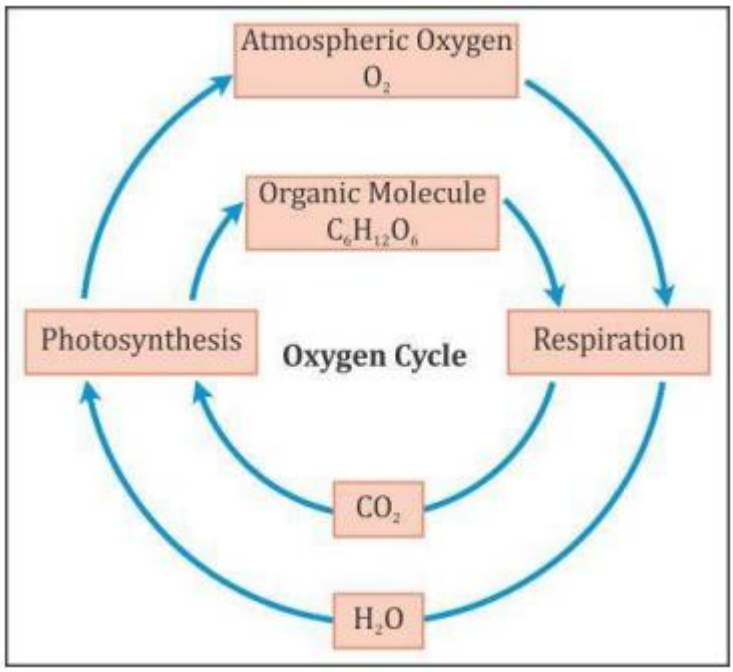
- Carbon is an important constituent found in all living organisms in the form of carbohydrates, proteins, fats and nucleic acids.
- Carbon dioxide is used by plants for photosynthesis.
- It is released by living organisms during respiration.
- It is also released during the burning of fossil fuels and volcanic eruptions.



Oxygen Cycle

- Oxygen constitutes about 21% of the total atmosphere.
- Living organisms require oxygen for respiration.

- During photosynthesis, oxygen is released in the atmosphere.
- Oxygen is also released during the process of decomposition of dead matter by bacteria.
- It is also present in the form of ozone in the atmosphere.
- Ozone absorbs the harmful ultraviolet radiations from the Sun and protects life on Earth.



Class : 9th Science
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Combustion
When organic substance burns in air O_2produce Co_2
$C+O_2 = Co_2$

Respiration
All livings take in O_2 and produce Co_2

Air: The breathe of life

Natural Resources

Air pollution
Eiffects: Affect respiratory system and causes diseases and skin allergies

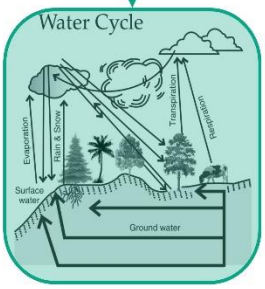
Water pollution
Eiffects: Addition of undesirable substances and removal of desirable substances, disturbance in ecological balance

Soil pollution
Eiffects: Food Crops affected adversely by and healthy nutrients are not available in the crop yield

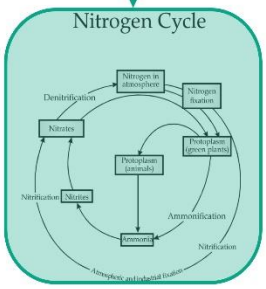
Ozone Layer O_3
- Triatomic module of oxygen O_3
- Depleted by CFCs, that Cause uv radiations from the sun to reach earth
- Effects: cause cataract, cancer damage of immune system, smog formation etc.

Biogeochemical Cycles

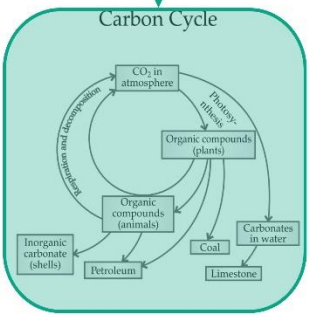
Water Cycle



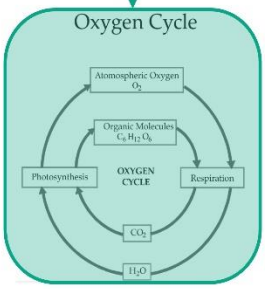
Nitrogen Cycle



Carbon Cycle



Oxygen Cycle



Important Question

➢ Multiple Choice Questions:

1. What is the constitution of nitrogen in our atmosphere?

(a) 28

(b) 78

(c) 55

(d) 92

2. Which of the following bacteria is responsible for nitrogen fixation?

(a) Pseudomonas

(b) Nitrosomonas

(c) Rhizobium

(d) None of these

3. One of the following factors does not lead to soil formation in nature.

(a) The sun

(b) Water

(c) Wind

(d) Polythene bags

4. Which step is not involved in the carbon cycle?

(a) Photosynthesis

(b) Transpiration

(c) Respiration

(d) Burning of fossil fuels

5. The main function of the Rhizobium bacteria is:

(a) To convert free nitrogen into nitrates

(b) To convert the nitrates into nitrogen

(c) Decomposition of ammonium salts

(d) Denitrification

6. Soil pollution mostly occurs by:

(a) Water

(b) Fertilizers and insecticides

(c) Mining

(d) Crops

7. What is the percentage constitution of carbon dioxide in the atmosphere of Venus and Mars?

(a) 95 – 97%

(b) 20 – 22%

(c) 35 – 40%

(d) 70 – 72%

8. Oxygen is found in the elemental form in the atmosphere to the extent of:

(a) 78%

(b) 38%

(c) 21%

(d) 95%

➢ Very Short Question:

1. What are the resources available on Earth for life to exist?

2. Name the compound of carbon responsible for the ozone hole in the atmosphere.

3. State the temperature range on the surface of the moon.

4. State any one difference between oxygen and ozone.

5. Name the stage in the life cycle of aquatic animals which is affected by a change in temperature.

6. Along with the natural resources available on the Earth, what else is required to meet the basic requirements of all life forms on the Earth?

7. How is biosphere a dynamic and stable system?

8. How do forests play a major role in maintaining the water cycle?

9. Why is step farming done in hills?

10. Why are root nodules useful for plants?

➢ Short Questions:

1. What are the sources of oxygen in the atmosphere?

2. What causes winds?

List any two methods of preventing soil erosion.

3. List the importance of oxygen gas and ozone gas in the atmosphere.

4. Mention one method by which living organisms influence the formation of soil.

5. Explain the occurrence of land breeze in coastal areas.

6. What are the two ways in which carbon dioxide is fixed in the environment?

7. Why do terrestrial forms require freshwater?

Give two examples where freshwater can be found in the frozen form on the Earth.

8. What is the role of the atmosphere in climate control?

➢ Long Questions:

1.

- Make a neat and labelled sketch of the nitrogen cycle in nature.
- Describe in brief the role of nitrogen-fixing bacteria and lightning in fixing nitrogen.

2. Explain the role of the atmosphere as a blanket. List the factors deciding the rainfall patterns.

3.

- Many municipal corporations are trying water harvesting to improve the availability of water. Give reason.
- Rainwater sometimes contains traces of acid. Why? Explain in brief.

➢ Assertion Reason Questions:

1. For two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

   a. Both Assertion and Reason are correct, and reason is the correct explanation for assertion.

   b. Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.

   c. Assertion is true but Reason is false.

   d. Both Assertion and Reason are false.

   Assertion: Earth's large area covered with the different forms of water.

   Reason: More amount of water present on earth surface as well it also found in the form of ice.

2. For two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below:

a. Both Assertion and Reason are correct, and reason is the correct explanation for assertion.

b. Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.

c. Assertion is true but Reason is false.

d. Both Assertion and Reason are false.

Assertion: Earth's large area covered with the different forms of water.

Reason: All plants need water hence water quantity is high on earth.

➢ Case Study Questions:

1. Nitrogen gas makes up 78% of our atmosphere and nitrogen is also a part of many molecules essential to life like proteins, nucleic acids (DNA and RNA) and some vitamins. Nitrogen is found in other biologically important compounds such as alkaloids and urea too. Nitrogen is thus an essential nutrient for all life-forms and life would be simple if all these life-forms could use the atmospheric nitrogen directly. Most commonly, the nitrogen-fixing bacteria are found in the roots of legumes (generally the plants which give us pulses) in special structures called root nodules. Other than these bacteria, the only other manner in which the nitrogen molecule is converted to nitrates and nitrites is by a physical process. During lightning, the high temperatures and pressures created in the air convert nitrogen into oxides of nitrogen. These oxides dissolve in water to give nitric and nitrous acids and fall on land along with rain. These are then utilised by various life forms.

Plants generally take up nitrates and nitrites and convert them into amino acids which are used to make proteins. These proteins and other complex compounds are subsequently consumed by animals. Once the animal or the plant dies, other bacteria in the soil convert the various compounds of nitrogen back into nitrates and nitrites. Thus, there is a nitrogen-cycle in nature in which nitrogen passes from its elemental form in the atmosphere into simple molecules in the soil and water, which get converted to more complex molecules in living beings and back again to the simple nitrogen molecule in the atmosphere.

(i) How much Nitrogen is present in our atmosphere?

(a) 76 %

(b) 77 %

(c) 78 %

(d) 79 %

(ii) Identify the correct statement:

Statement 1 – Nitrogen is an essential nutrient for all life-forms and life.

Statement 2 – all life-forms use the atmospheric nitrogen directly.

Statement 3 – Nitrogen is a part of DNA & RNA

Statement 4 – Our atmosphere have 79 % nitrogen.

(a) Both 1 & 2

(b) Both 1 & 3

(c) Both 3 & 4

(d) All of the above

(iii) Plants use nitrates and nitrites and convert them into:

(a) Vitamins

(b) Enzymes

(c) Amino acids

(d) Nitrogen

(iv) What is the main function of root nodules in legume plants?

(v) Explain the physical process by which nitrogen molecule is converted to nitrates and nitrites?

2. Oxygen is a very abundant element on our Earth. It is found in the elemental form in the atmosphere to the extent of 21%. It also occurs extensively in the combined form in the Earth's crust as well as also in the air in the form of carbon dioxide. In the crust, it is found as the oxides of most metals and silicon, and also as carbonate, sulphate, nitrate and other minerals. It is also an essential component of most biological molecules like carbohydrates, proteins, nucleic acids and fats (or lipids).

When we talk of the oxygen-cycle, we are mainly referring to the cycle that maintains the levels of oxygen in the atmosphere. Oxygen from the atmosphere is used up in three processes, namely combustion, respiration and in the formation of oxides of nitrogen. Oxygen is returned to the atmosphere in only one major process, that is, photosynthesis. And this forms the broad outline of the oxygen-cycle in nature.

Though we usually think of oxygen as being necessary to life in the process of respiration, it might be of interest to you to learn that some forms of life, especially bacteria, are poisoned by elemental oxygen. In fact, even the process of nitrogen-fixing by bacteria does not take place in the presence of oxygen.

(i) How much oxygen is present in our atmosphere?

(a) 20 %

(b) 21 %

(c) 22 %

(d) 23 %

(ii) Identify the correct statement

Statement 1 – Oxygen is also an essential component of most biological molecules.

Statement 2 – Oxygen is returned to the atmosphere through process called photosynthesis

Statement 3 – Oxygen -cycle maintains the levels of oxygen in the atmosphere.

Statement 4 – Our atmosphere have 21 % oxygen.

(a) Only 1

(b) Both 2 & 3

(c) Both 1 & 4

(d) All of the above

(iii) Oxygen from the atmosphere is used up in three main processes,

(a) Combustion

(b) Respiration

(c) Formation of oxides of nitrogen

(d) All of the above

(iv) By which process Oxygen is returned to the atmosphere

(a) Respiration

(b) Photosynthesis

(c) Photolysis

(d) None of the above

(v) Write the molecular formula of oxygen?

✓ Answer Key-

➢ Multiple Choice Answers:

1. (b) 78
2. (c) Rhizobium
3. (d) Polythene bags
4. (b) Transpiration
5. (a) To convert free nitrogen into nitrates
6. (b) Fertilizers and insecticides
7. (a) 95 – 97%
8. (c) 21%

➢ Very Short Answers:

1. Answer: Air, water and land are the resources available on the Earth which help life to exist.
2. Answer: Chlorofluorocarbons (CFC's) are responsible for the ozone hole in the atmosphere.
3. Answer: The temperature ranges from -190°C to 110°C on the moon
4. Answer: Oxygen is a diatomic molecule with formula 02 whereas ozone is a triatomic molecule-with formula 03.
5. Answer: The stage of animals which is affected by the change in the temperature is – the eggs at the hatching stage, the larvae and the young ones of the animals.
6. Answer: Solar energy is required to meet the basic requirements of all life forms on Earth.
7. Answer: There is a constant interaction between the biotic and the abiotic components of the global ecosystem (biosphere) which makes it a stable system. The basic composition and the structure of the system do not change while carrying out the various processes. So, it is a stable system.
8. Answer: The amount of water vapour in the atmosphere is dependent on the transpiration of water from the leaves of the plants present in a forest. Also, the storage of water in watershed is influenced by the forests. So, forests play a major role in maintaining the water cycle.
9. Answer: Step farming is done in hills to prevent soil erosion by slowing down the speed of the water running down the slopes.
10. Answer: The root nodules of leguminous plants contain nitrogen-fixing bacteria like the Rhizobium which help to increase the fertility of the soil by fixing atmospheric nitrogen.

➢ Short Answer:

1. Answer:

   The sources of oxygen in the atmosphere are:

   - Oxygen released during photosynthesis by plants
   - The dissociation of oxides from their compounds
   - The disintegration of ozone in presence of UV rays
   - As the water in combined form

2. Answer:

   Due to the unequal heating of land and water, the land get heated up faster during the day, the air on land rises up and creates a region of low pressure. As a result, the air over the sea moves towards the region of low pressure formed on the land. This causes winds to flow.

   (a) Overgrazing by cattle should be avoided.

(b) Large scale afforestation should be done as roots of plants prevent the soil from getting carried away.

(c) Increasing the vegetation cover on the ground reduces the impact of flowing water on soil and prevents it from getting washed away.

(d) Contour farming can be done by ploughing the land in furrows across the natural slope of the land to trap water flowing down.

(e) Step farming is practised in hilly regions which reduce the flow of water and give it more time to percolate into the soil.

3. Answer: Role of Oxygen gas: It helps in the process of combustion, respiration and formation of many organic compounds.

   Role of Ozone: It absorbs the harmful UV rays of the Sun which can cause skin diseases and cancer on reaching the Earth's surface.

4. Answer: The living organisms like lichens and mosses are the initial colonisers of rocks which secrete certain chemical substances that dissolve the minerals of rock and cause the gradual weathering of rocks. The rocks get broken down into small, fine particles of soil. So, living organisms play an important role in the formation of soil.

5. Answer: During the day, in coastal regions, the air above land gets heated faster and warm air being lighter rises up thereby creating a region of low pressure. The air over the sea then moves towards the area of low pressure. The movement of air from one region to the other creates winds. At night, water cools down slower than the land, so the air above water would be warmer than the air above land. This causes air over the land to move towards the region of low pressure over water.

6. Answer: Carbon dioxide is fixed in the atmosphere when:

   Green plants utilise the carbon dioxide and convert it into glucose during photosynthesis.

   Carbon dioxide dissolved in seawater in the form of carbonates gets used up by the marine animals for the formation of their shells.

7. Answer: The terrestrial organisms require freshwater as they face osmotic problems if kept in marine water because they have low osmotic concentration. In order to maintain the balance of the salts present in their body, freshwater organisms require a medium having less salt concentration i.e., freshwater.

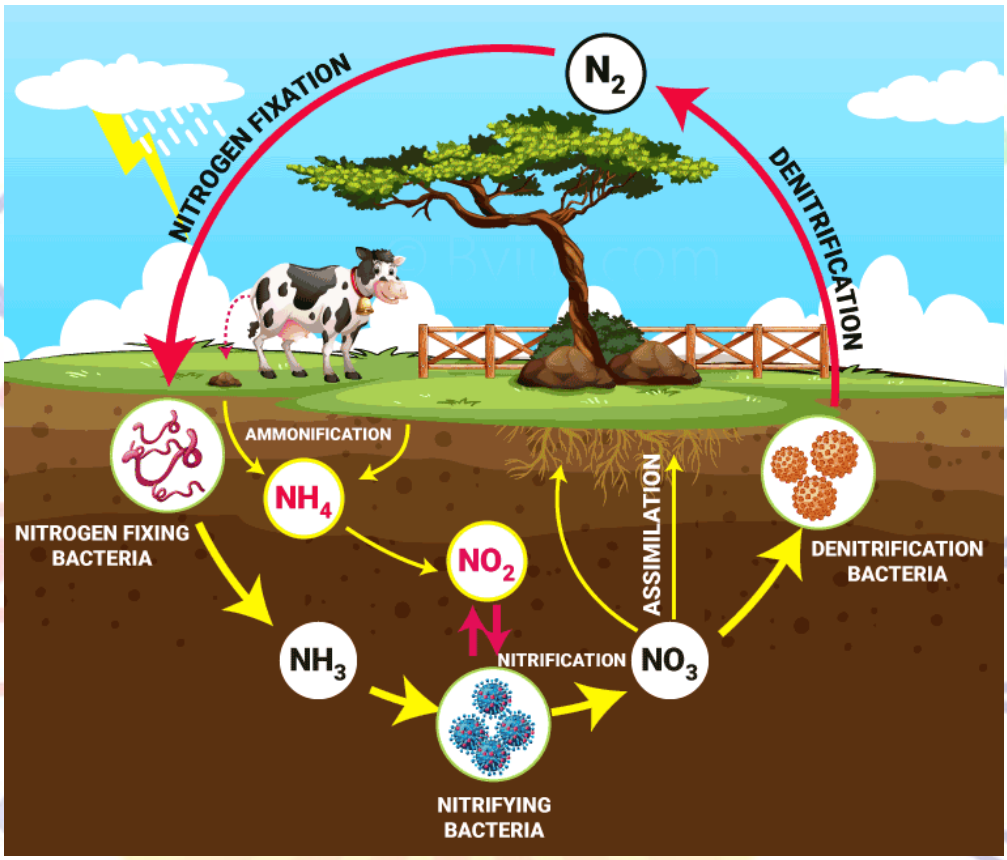
   Freshwater can be found in a frozen form at polar ice-caps and the glaciers.

8. Answer: The atmosphere acts as a buffer which checks excessive rise in temperature during the day and prevents excessive cooling of the Earth during the night. The atmosphere helps to keep the average temperature of the Earth steady.

➢ Long Answer:

1. Answer:

- The nitrogen cycle is:



- The atmospheric nitrogen can be fixed in the following ways:

  By nitrogen-fixing bacteria: The nitrogen-fixing bacteria live either in a symbiotic association like the Rhizobium in the root nodules of the legumes or live freely like Azotobacter. The bacteria fix the atmospheric nitrogen into nitrates which are absorbed by the plants in soluble form and assimilated in their body.

  By lightning: Lightning has enormous energy which breaks nitrogen molecules and enables their atoms to combine with oxygen present in the air to form nitrogen oxides. These oxides dissolve in rain, form nitrates and are carried to the Earth with the rains.

2. Answer: The atmosphere is a blanket of air around the Earth which acts as a buffer to prevent the excessive or

   sudden rise of temperature during the day and also prevents excessive cooling of the Earth during the night. It slows down the escape of heat into the outer space during the night.

   Thus, the atmosphere helps to keep the average temperature of the Earth fairly steady during the day and also during the whole year. The prevailing wind patterns decide the rainfall patterns. The South-West monsoon and the North-East monsoon cause rains in large parts of India.

3. Answer:

- The Municipal Corporations are trying water harvesting in order to recharge the underground water reservoirs and the underground water level. This ensures the availability of water during the scarcity of rainfall or water. Rainwater harvesting involves the collection of water from surfaces on which rain falls and stores this water for later use. Generally, the water is collected from the roofs of buildings and stored in rainwater tanks.
- Combustion of fossil fuels releases oxides of nitrogen (NO_2) and sulphur (SO_2) which dissolve in rainwater to form their respective acids. These acids then fall along with rains and such rain is called acid rain. Due to the presence of such acids, the rainwater sometimes contains traces of acids.

➢ Assertion Reason Answer:

1. (b) Both Assertion and Reason are correct, and Reason is not the correct explanation for Assertion.
2. (c) Assertion is true but Reason is false.

➢ Case Study Answers:

1.

(i) (c) 78 %

(ii) (b) Both 1 & 3

(iii) (c) Amino acids

(iv) Nitrogen fixation is the main function of root nodules which is one of the most important features of legumes.

(v) During lightning, the high temperatures and pressures created in the air convert nitrogen into oxides of nitrogen. These oxides dissolve in water to give nitric and nitrous acids and fall on land along with rain.

2.

(i) (b) 21 %

(ii) (d) All of the above

(iii) (d) All of the above

(iv) (b) Photosynthesis

(v) Molecular formula of oxygen is: O_2