Grade – 9

Lesson – 14 NATURAL RESOURCES

CHAPTER AT A GLANCE

BIOSPHERE

Life supporting zone of Earth where atmosphere, hydrosphere and lithosphere interact

- **Lithosphere** – Outer Crust of our Planet Earth
- **Hydrosphere**
  - Portion of earth's surface covered with water
  - It is 75% of total earth's surface
- **Atmosphere** – Multilayered gaseous envelope of air that covers the planet earth like a blanket.
- **Biotic Components / Living Components**
- **Abiotic Components / Non-Living Components**
  - Air*
  - Water**
  - Soil***
  - Temperature
  - Light

Rate of Atmosphere

- Nitrogen (78%)
- Oxygen (21%)
- Carbon dioxide (0.03%)
- Argon (0.9
- Helium, Neon, Ozone, Ammonia, Water Vapour (0.04%)

Climate Control

- Its acts as a protective blanket for the Earth
- Atmosphere is a bad conductor of heat and keeps the average temperature of the Earth constant during the day and night and through out the whole year.

Winds

- Movement of air from one region to another region causes winds.
- In coastal regions, during the day both the sea water and land gets heated up due to sunlight. The land gets heated up faster, so air above land rises up and cool air from sea flows towards land, which is called *sea breeze*. Whereas, during the night, cooling of land is faster than sea water, Thus, warm air above sea rises up and cool air from land flows towards sea, which is called *land breeze*

Rain

- The hot air carrying water vapour rises above. The hot air first expands and then cools causing water vapours to condense into tiny droplets. Suspended particles like dust act as nucleus and facilitate the formation of water droplets.
- Water droplets when it becomes big and heavy, fall down in the form of rain, or snow or hail when the atmospheric temperature is too low.

Air*

Air Pollution: Undesirable change in the physical, chemical or biological characteristics of air.

Causes: Burning of fossil fuels like coal and petroleum, automobiles, thermal power plants and industries

Harmful Effects:
- Affects respiratory system and cause diseases such as bronchitis, asthma, lung cancer, tuberculosis and pneumonia etc.,
- Gases such as NO, SO_2, are dangerous if inhaled and also causes acid rain.
- Cause lowering of visibility caused by smog.
- Increases the chances of allergies, cancer and heart diseases

Acid Rain: Pollutant gases such as NO, SO_2, get dissolved in rains water, makes it acidic, and this falls as acid rain.

Water**

Major part if found in seas and oceans, Fresh water is found in ice-caps in rivers, lakes and ponds and as underground

Water Pollution: Any physical, biological or chemical change in quality of water affecting living organisms and making it unfit for use.

Causes:
- Excessive use of fertilisers and pesticides pollute water bodies and underground water.
- Sewage from homes land factories
- Hot water discharged from factories into water bodies.

Harmful Effects:
- Fertilisers and pesticides are poisonous for human body.
- Certain bacteria cause disease like cholera, etc
- Reduces dissolved oxygen in water bodies affecting the aquatic life,
- Change in temperature of water bodies affects breeding of aquatic organisms.

Soil***

It forms the upper surface of the land that supports plant growth. It is a home for various microorganisms. If provides different nutrients to living organisms.

Components of Soil

Contains small particles of rocks, humus, microscopic life and mineral nutrients

Top Soil

Topmost layer of soil that contains humus and living organisms. Humus make the soil nutrient rich. It also improves the water holding capacity of the soil

Soil Pollution

Removal of useful components from the soil and addition of other substances, which affect the diversity of organisms present in the soil and also the soil fertility

Soil Erosion

Washing away of fertile too soil due to climatic and physical processes

PREVENTION OF SOIL EROSION
- Practicing intensive cropping, helps the plants roots to hold the soil particles.
- Providing proper drainage canals around fields.
- Practicing terrace farming in hilly regions

Causes of Soil Erosion
- Strong wind blows away top soil particles.
- Rain washes away unprotected top soil
- Improper tilling
- Frequent flooding
- Deforestation

Formation of Soil

Sun Effect
- Due to sun heat rocks expand during day and then contracts at night.
- Unequal expansion and contraction from cracks on rocks which break them up into smaller pieces

By Water
- Water enters into the cracks in the rocks, which if freezes widen the cracks
- Water carries rock particles downstream which break down into smaller and finer particles through abrasive action. It results in soil formation far away from its parent rock.

By Wind
- Wind erode rocks down
- They also carry sand from one place to another.

Living Organisms
- Lichens convert rock surface into powder which form a thin layer of soil.
- Moss and roots of big trees also break the rocks

BIOGEOCHEMICAL CYCLES

- **BIOGEOCHEMICAL CYCLES:** It is the cyclic flow of nutrients between non-living environment and living organisms. It involves transfer and circulation of the essential nutrients like carbon, hydrogen, oxygen and nitrogen in a biosphere.

The Water | **The Nitrogen Cycle** | **The Carbon Cycle** | **The Greenhouse Effect** | **The Oxygen Cycle**

The Water Cycle :

- It is the process by which water evaporates and fails on the land in the form of rain and later flows back into the sea via rivers.
- Some a water goes underground and comes up to surface through springs and which can be drawn by well or tube well
- Plants release water through transpiration
- Water is released into atmosphere from soil, rivers and oceans by evaporation. Water is used by all living organisms for the various life - processes

The Carbon Cycle :

- Plants utilize atmospheric CO_2 in photosynthesis to produce carbohydrates
- Herbivores consume the carbohydrate which passes through small and large carnivores
- CO_2 returns to biosphere through :
  - Respiration of plants and animals
  - Decomposition of organic washes and dead bodies
  - Burning of fossil fuels

The Greenhouse Effect :

Absorption of infrared radiation from sun by greenhouse gases such as CO_2 , etc, thereby increasing the temperature of earth. It is called greenhouse effect. It leads to global warming.

The Oxygen Cycle

- O_2 from atmosphere is used in three main process:
- Combustion, respiration and in the formation of oxides of N_2
- O_2 is returned to atmosphere by one major process, i.e. photosynthesis

The Nitrogen Cycle

- Nitrogen forms various biologically important compounds, e.g. nucleic acids (DNA and RNA), Vitamins, proteins etc.
- 78% of our atmosphere is composed of nitrogen gas. All living organisms require nitrogen but it cannot be directly utilised from the atmosphere. Plants utilize nitrogen as nitrates or nitrites dissolved in water

OZONE LAYER

The Nitrogen Cycle

- A layer of ozone (O_3) is present in the upper atmosphere called the ozone layer. It absorbs the harmful ultraviolet radiations from the sun.
- Certain chemicals used by man like CFCs (Chlorofluorocarbons), when released into the atmosphere results in the reduction of the ozone layer. This allows harmful UV rays to reach the earth.
- The depletion of the ozone layer was noticed over Antarctica.

FOUR MAIN STEPS OF NITROGEN CYCLE

Nitrogen fixation | **Ammonification** | **Nitrification** | **Denitrification**

- It is the process of converting atmospheric nitrogen into oxides of nitrogen. These oxides dissolve in water and utilized by plant
- The methods by which nitrogen fixation can occur are :

(i) Atmospheric nitrogen fixation : High temperature and pressure caused by lighting helps to convert nitrogen into oxides of nitrogen that dissolves in rain water and fall on land.

(ii) Industrial nitrogen fixation : It is done in industries to make nitrogenous fertilizers.

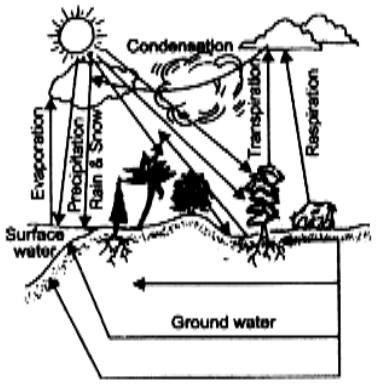
(iii) Biological nitrogen fixation : This is done by various N_2 fixing bacteria, e.g. bacteria like Rhizobium (present in root nodules of leguminous plants), blue-green algae, etc.

It is the process of conversion of ammonia into nitrates and then into nitrates. This is done by nitrifying bacteria, e.g. Nitrosomonas and Nitrobactor

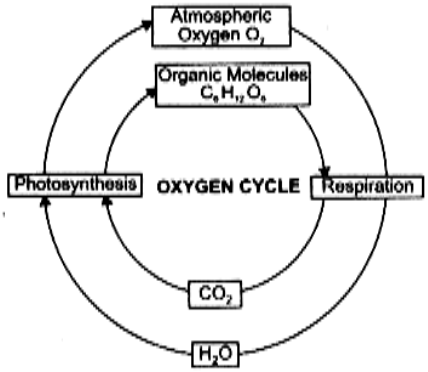
It is the process of reducing nitrates present in the soil to release nitrogen gas back into atmosphere, e.g. Pseudomonas

It is the process of decomposing complex, dead organic matter into ammonia. This is done by microorganisms living in the soil. E. g. decay bacteria and fungi.

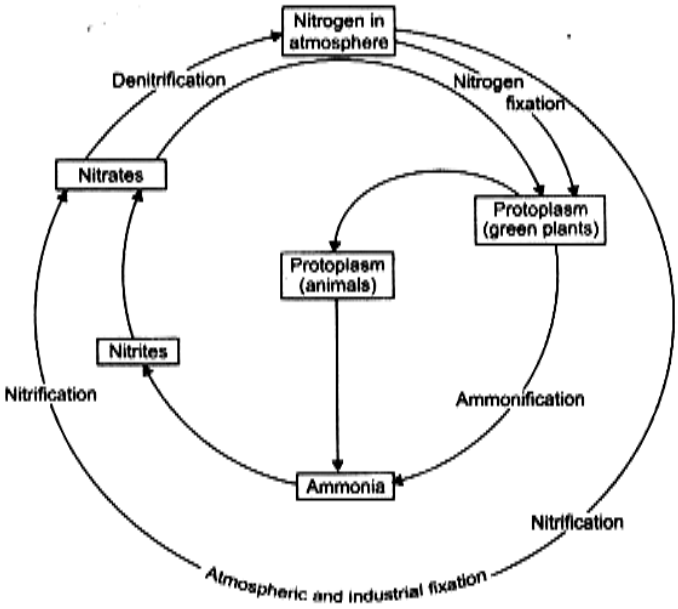
IMPORTANT DIAGRAMS



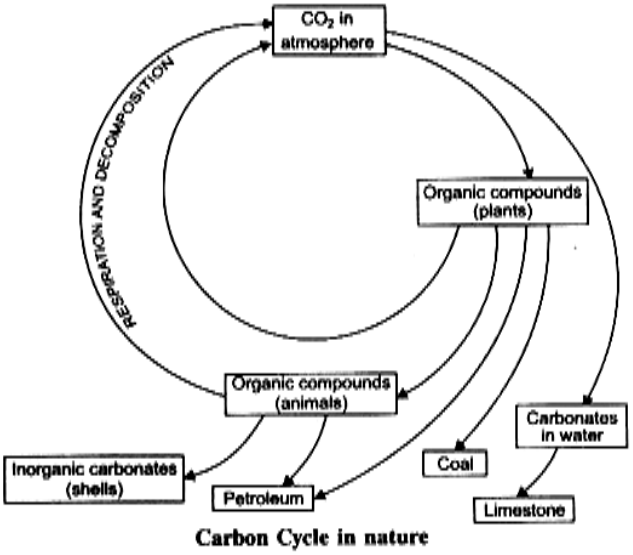
Water cycle in nature



Oxygen Cycle in nature



Nitrogen Cycle in nature



Carbon Cycle in nature

Objective Type Questions

Multiple choice questions

1. The major component of the atmosphere on Mars and Venus is

   a) Oxygen b) Water vapour

   c) Carbon dioxide d) Nitrogen

2. The main source of water in India is

   a) sea water b) surface water c) groundwater d) rainwater

3. The life supporting gases such as O_2 CO_2 and N_2 are chiefly concentrated in the

   a) troposphere b) stratosphere c) exosphere d) ionosphere

4. All of earth's water, land and atmosphere, within which life exists is known as

   a) biosphere b) population c) biome d) community

5. Air is a mixture of gases with the following gas in maximum percentage

   a) Nitrogen b) Oxygen c) Hydrogen d) Carbon dioxide

6. The average amount of CO_2 in the atmosphere is

   a) 3.0% b) 0.3% c) 0.03% d) 0.003%

7. The average amount of N_2 in the atmosphere is

   a) 0.3% b) 0.03% c) 7.8% d) 78%

8. The amount of carbon dioxide in the atmosphere has increased in recent years. Environmentalists suggest this change is a direct result of the

   a) Dumping of inorganic material into lakes and rivers

   b) Improper storage of solid and nuclear waster

   c) Use of herbicides and toxic substances such as asbestos and DDT.

   d) Overcutting of forests and the increased use of fossil fuels.

9. When water mixes with carbon dioxide in the air, it forms

   a) carbonic acid b) sulphuric acid c) hydrochloric acid d) ozone

10. Smog is the mixture of

a) smoke + CO_2 b) smoke+ nitrogen c) smoke + fog d) smoke + ozone

11. Which of the following processes provide most of the oxygen found in the earth's atmosphere?

a) Aerobic respiration b) Anaerobic respiration

c) Photosynthesis d) Fermentation

12. In nutrient cycle, minerals tend to be dispersed through

a) evaporation b) assimilation

c) surface and sub-surface run off d) convection

13. Why is soil erosion more common in areas that lack adequate vegetation?

a) Because the lack of adequate vegetation affects the soil pressure and erosion rate.

b) Because plant roots help keep the soil in place.

c) Because soil erosion is stopped by reduced vegetation

d) Because gravity pulls the plants and increases erosion.

14. Soil composition is dependent on weathering because

a) it contributes sediment to the soil

b) it moves the topsoil to other areas where it is more needed

c) it makes the soil more fertile

d) it keeps the soil moist

15. Soil erosion is more common in

a) valleys b) sloping hills c) steep slopes d) ground level

16. Which of the following processed is involved in the water cycle?

a) Bathing, drinking and swimming

b) Paddling, swimming and drinking

c) Evaporation, dehydration and hibernation

d) Evaporation, condensation and precipitation

17. The process in which water vapour changes into liquid is called

a) condensation b) precipitation c) evaporation d) transpiration

18. In nitrogen cycle, which bacteria are responsible for nitrification?

a) Rhizobium b) Nitrosomonas

c) Nitrosomonas and Nitrobacter d) Clostridium

19. The conversion of No_3 to N_2 is known as

a) Nitrification b) Nitrogen c) Ammonification d) Denitrification

20. Why is it difficult to integrate nitrogen gas from the atmosphere in the nitrogen cycle of the biosphere?

a) Most plants do not require organic nitrogen compounds for survival

b) Nitrogen is not very abundant in the atmosphere

c) Few organisms can directly utilise atmospheric nitrogen gas.

d) Living organisms quickly absorb nitrogen gas.

21. The atmosphere of the earth is heated by radiations which are mainly.

a) radiated by the sun b) re- radiated by land

c) re - radiated by water d) re- radiated by land and water

22. If there were no atmosphere around the earth, the temperature of the earth will

a) increase b) go on decreasing

c) increase during day and decrease during night d) be unaffected

23. What would happen, if all the oxygen present in the environment is converted to ozone?

a) We will be protected more

b) It will become poisonous and kill living forms

c) Ozone is not stable, hence it will be toxic

d) It will help harmful sun radiations to reach earth and damage many life forms.

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

a) the sun b) water c) wind d) polythene bags

25. The two forms of oxygen found in the atmosphere are

a) water and ozone b) water and oxygen c) water and carbon dioxide

26. The process of nitrogen – fixation by bacteria does not take place in the presence of

a) molecular form of hydrogen b) elemental form of oxygen

c) water d) elemental form of nitrogen

27. Rainfall patterns depends on

a) the underground water table b) The number of water bodies in an area

c) the density pattern of human population in an area

d) the prevailing season in an area

28. Among the given options, which one is not correct for the use of large amount of fertilizers and pesticides?

a) They are eco-friendly

b) They turn the fields barren after some time

c) They adversely affect the useful component from the soil.

d) They destroy the soil fertility

29. The nitrogen molecules present in air can be converted into nitrates and nitrites by

a) a biological process of nitrogen fixing bacteria present in soil

b) a biological process of carbon fixing factor present in soil

c) any of the industries manufacturing nitrogenous compounds

d) the plants used as cereal crops in field.

30. The term "water pollution" can be defined in several ways. Which of the following statements does not five the correct definition?

a) The addition of undesirable substances to water-bodies

b) The removal of desirable substances from water-bodies

c) A change in pressure of the water-bodies

d) A change in temperature of the water-bodies

1. c	2. d	3. a	4. a	5. a	6. c	7. d	8. d	9. a	10. c
11. d	12. c	13. b	14. a	15. c	16. d	17. a	18. c	19. d	20. c
21. d	22. c	23.. b	24. d	25. c	26. b	27. b	28. a	29. a	30. c

Match the following

31.

Column I	Column II
1. Air pollution	A. CFC
2. Water pollution	B. Oxides of nitrogen and sulphur
3. Global warming	C. CO_2
4. Ozone layer depletion	D. Fertilizers, Pesticides, Sewage

1. B	2. D	3. C	4. A

Fill in the blanks

32. _____ and water are the main factors for causing soil erosion.

33. _____ covers whole of the earth like a blanket

34. The process in which liquid water charges into gas is called _____.

35. Vegetation is an example of _____ component of the environment.

36. Bacteria drives the _____ cycle

32. Wind	33. Atmosphere	34. evaporation	35. biotic	36. nitrogen

True or False

37. Water gets heated faster than land

38. The combustion of fossil fuels increases the amount of suspended particles in air

39. Methane is a greenhouse gas.

40. Sulphur dioxide plays a major role in global warming.

37. False	38. True	39. True	40. False

Direction (Q -41 and Q-43) : In the following questions, the Assertion and Reason have been put forward. Read the statements carefully and choose the correct alternative from the following:

a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion

b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion

c) Assertion is true but the Reason is false

d) The statement of the Assertion is false but the Reason is true

41. **Assertion** : Percentage of CO_2 in atmosphere is a mere fraction of 1%

Reason : Green plants convert CO_2 in glucose. Marine animals use carbonates dissolved in sea water to make the shells.

a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion

42. **Assertion** : In coastal regions during day, the direction of wind is from the sea to the land.

Reason : During the day, the air above the land gets heated faster and starts rising which creates a region of low pressure and air over the sea moves into this area of low pressure.

a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion

43. **Assertion** : When fossil fuels are burnt, oxides of Nitrogen and sulfur are formed

Reason : Smog is a visible indication of air pollution

b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion

44. Write the Two Biotic components of the biosphere

The two biotic components of biosphere are plants and animals

45. Define the term natural resource

Natural resource is the stock of the nature such as air, water, soil coal minerals animals and plants that are useful to making in many ways.

46. What are the resources available on earth for life to exist

The resources available on earth for life to exist are land, water and air

47. Name two types of Natural resources

Renewable and non-renewable

48. What are the two components of biosphere?

The two components of biosphere are :

a) Biotic - Plants and animals

b) Abiotic - Air, water, soil, light and temperature

49. Which of the following is not part of biotic community:
Algae, Water, Fish, Bacteria?

Water

50. What is the physical environment of an ecosystem called?

Abiotic component

51. What is the functional unit of the environment, comprising the living and non-living components called?

Ecosystem, is the functional unit of the environment

52. List two activities of man which lead to environmental pollution

a) Burning of fossil fuels b) Use of fertilizers and pesticides

53. Give the name of two air pollutants

Two air pollutants are oxide of sulphur and oxide of nitrogen.

54. Name the two major constituents of the atmosphere

Nitrogen (78%) and Oxygen (21%)

55. Which component of air is essential for animals?

Oxygen

56. What would happen if carbon dioxide content of the atmosphere increases?

Temperature of the earth's atmosphere would increase

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

95 – 97 % of CO_2 is in the atmosphere of Venus and Mars.

58. Name the winds that bring about rain in most parts of India

The winds are called south-west or north – east monsoons.

59. Name the atmospheric gas that leads to global warming

Carbon dioxide

60. What is the importance of greenhouse gases present in the atmosphere?

Gases that trap atmospheric heat are called greenhouse gases (CO_2, N_2 O_2). The gases keeps the earth surface warm. Greenhouse gas (CO_2) absorb the infra-red radiation and keep the earth's temperature more or less same during day.

61. How is CO_2 fixed in the atmosphere?

Plant utilizes atmospheric CO_2 in photosynthesis to produce carbohydrates. CO_2 is returned to the atmosphere during respiration and during burning to fossil fuel.

62. Name two biologically important organic compounds that contain both oxygen and nitrogen

Proteins and nucleic acids (DNA and RNA)

63. Name two gases which cause greenhouse effect

The gases which causes greenhouse effect are carbon dioxide, nitrous oxide, CFCs and methane

64. State the role of respiration in 'Oxygen Cycle'.

The role of respiration in 'Oxygen Cycle' is that it releases carbon dioxide and water by consuming O_2

65. Name any two gases produced by the combustion of fossil fuels.

Carbon dioxide and Sulphur

66. Name few alternative sources of energy other than conventional fossil fuels.

Wind energy, solar energy, tidal energy, biogas etc.

67. Name a pollution free source of energy.

Liquid Hydrogen

68. What destructive effects do the chlorofluorocarbons carbons bring about in the atmosphere?

Chlorofluorocarbons react with ozone layer and form holes in it

69. Why is water rarely available in pure form?

Because many atmospheric gases and solid substances get dissolved in it

70. In how many forms is water available?

2.5% of earth water is fresh eater which are mostly from glaciers and ice-sheets . Liquid water is also found as ground water. Surface water and ground water also come from the rainfall that is used for various purposes.

71. The industries in an area used up the tube well water excessively. It was found that most of the trees in that area dried up. What could be the cause for this?

The water table in that area must have gone down,. So, trees might not be getting sufficient water and other nutrients.

72. Which component of air has the highest solubility in water?

Carbon dioxide

73. What is the main cause of floods in rivers?

Deforestation,. Heavy rainfall lack of proper drainage or poor soil quality that helps percolation of water down into the soil.

74. Mention the regions where the rainfall is highest and lowest in the country.

Highest rainfall is in the wet zone and lowest rainfall is in the arid zone

75. How are rainfall patters decided?

Rainfall patters are decided by the prevailing wind patterns.

76. Mention two factors which replenish water back in the environment

Transpiration and respiration

77. Name the free living nitrogen fixing bacteria

Rhizobium

78. State two factors responsible for weather in of rocks

Two factors responsible for weathering of rocks are :

a) Alternate heating and cooling during day and night

b) Abrasion with flowing water and rocks carried by water.

79. What is soil?

Soil is a mixture of small particles of rocks, decayed living organisms and various forms of microscopic life.

80. How is the quality of soil decided?

Quality of soil is decided by the amount of humus and the microscopic organisms ap

81. In which regions is soil erosion very difficult to revert?

In hilly or mountainous regions Soil erosion is very difficult to river

82. Arrange the following steps in order of their sequence of occurrence in Nitrogen Cycle starting from nitrogen fixation

Ammonification, Nitrification, Denitrification, Nitrogen fixation

Nitrogen fixation, Ammonification, Nitrification, Denitrification

83. Organisms play a vital role in nitrogen fixation,. Write two names of such organisms

Rhizobium bacteria and blue-green algae.

84. Why is nitrogen cycle called a a perfect cycle?

Nitrogen cycle called a perfect cycle because overall amount of nitrogen in atmosphere and water bodies is maintained and also the use of chemical nitrogen fertilizer maintains its concentration in biosphere.

85. Name the structure found in roots of legumes that contain nitrogen fixing bacteria.

Structures found in roots of legumes that contain nitrogen fixing bacteria are called root noodles.

86. Given one factor which replenished oxygen in the atmosphere

Photosynthesis

87. Which part of solar radiation is absorbed by ozone layer?

Ozone layer absorbs the harmful UV rays of the sun.

88. State one cause of the depletion ozone layer

When harmful chemicals like chlorofluorocarbons are released in the atmosphere, it accumulates in the upper atmosphere and reacts with ozone resulting in depletion of ozone layer.

89. Name a compound responsible for the depletion of ozone layer in the atmosphere

CFCs (Chlorofluorocarbons) are responsible for the depletion of ozone layer in the atmosphere

90. How is ozone layer formed?

Ozone is formed by the action of sunlight on oxygen of the air in the upper atmosphere starting at a height of about 16 km

$$3O_2 \xrightarrow{\text{UV rays}} 2O_3$$

The concentration of Ozone is maximum at a height of about 23 km . This blanket of Ozone around the earth is called ozone layer.

91. In which zone of atmosphere, ozone layer is present?

Stratosphere

92. What would happen if ozone layer in the atmosphere disappears?

Ultraviolet radiation would reach the earth and cause skin cancer blindness

93. How does ozone layer protect us from harmful effects in the environment?

Ozone layer surrounds the earth and prevents harmful UV radiations from reaching earth and thereby protecting the environment.

94. Name the main reservoir of gaseous carbon and main deposit of biological carbon

Main reservoir of gaseous carbon is atmosphere. Main deposit of biological carbon is oceans.

95. Why is the biosphere called the largest ecological system?

Biosphere is called the largest ecological system, because it consists of all ecosystems. The biosphere includes the entire life supporting zone of the earth i.e it consists of lithosphere (land). Hydrosphere (water) and atmosphere (air).

96. What is the importance of the ozone layer?

The concentration of ozone increases gradually forming a thick ozone blanket known as Ozone layer. This layer absorbs the harmful effects of these radiation.

97. Give two ways of preventing a water pollution

a) Treatment of industrial and domestic waster water before disposal

b) Careful use of fertilizers and fertilizers, so that are washed into the water bodies

98. Why do terrestrial life-forms require fresh water?

Terrestrial life-forms cannot tolerate the high amounts of dissolved salts in saline water. They need fresh water for cellular reactions transportation and excretion processes.

99. Pesticides and insecticides are sprayed in fields then how do they reach water bodies to pollute?

Excessive spraying of pesticides and insecticides are carried away by rainwater or irrigation water to the nearby water bodies like ponds, lakes or rivers.

100. List two ways in which soil erosion is caused

a) Wind caused soil erosion by carrying away the top soil particles

b) Deforestation leads to soil erosion.

I Short Answer Type Question

101. What are the two forms of oxygen found in atmosphere? What is their importance?

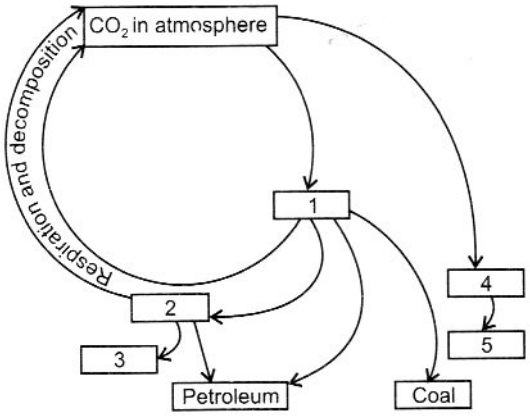
In atmosphere, oxygen is found as diatomic oxygen or as triatomic ozone which has three atoms of oxygen.

Importance of O_2 : It is required by all living plants and animals for respiration

Importance of ozone. Layer of ozone in the upper atmosphere stratosphere protects the earth from harmful ultraviolet radiation of the Sun.

102. a) Name the gas which is used in the process of photosynthesis

b) Complete the following cycle



a) Plants utilize the atmospheric carbon dioxide in the process of photosynthesis

b) 1. Organic compounds (plants)

2. Organic compounds (animals)

3. Inorganic carbonates (shells)

4. Carbonates in water

5. Limestone

103. What is the contribution of photosynthesis in Carbon cycle?

Photosynthesis removes carbon dioxide from the atmosphere and converts it into carbohydrates. When plants die, they get converted into coal inside the earth. Coal when burnt, produces CO_2which then escaped into the atmosphere. Thus, photosynthesis hold an important place in Carbon cycle.

104. Our Earth is covered with approximately 75% water, still there is an urgent need to conserve water. Why?

Even though 75% of Earth's surface is covered with water, a majority of it is salt water. Only 3% of water on the Earth is fresh water and most of it is in frozen state in glaciers. In addition to scarcity of fresh water, many sources of water supply are contaminated with industrial waste or sewage. Because of these reasons, we should conserve water.

105. Describe any three ways in which water is important for the activities of living beings.

Water is considered to be the source of life. It is important for animal life for the following reasons.

a) It is a vital body fluid which is essential for regulating the processes such as digestion transport of nutrients and excretion

b) It regulates the body temperature via sweating and evaporation.

c) We need water for drinking, cooking cleaning irrigation, as a medium of transportation and generation of hydel power.

106. Water is meant by RRR of water bodies repair, renovation and restoration of water bodies.

It is a Govt of India for Repair, Renovation and Restoration (RRR) of Water bodies directly linked to Agriculture started in January 2005. Estimates cost of the project was Rs300 crore to be shared by Centre and State in the ratio of 3:1. The objectives of the Scheme were to restore and augment storage capacities of water bodies and also to recover and extend their lost irrigation potential. The Scheme has been approved for 26 district projects in 15 states

107. Explain how an excessive use of nitrate fertilizers in agricultural fields may affect human life.

The industrial fixation of nitrogen and use of fertilizers are increasing at a faster rate denotification. Most of the excess nitrogen fertilizers is carried to the water bodies.

The increased nitrogen in rivers and lakes often promote the growth of algae and other phytoplanktons. This harms the growth of desirable animals like finfish and shellfish. It also harms other forms of aquatic life by reducing oxygen level of water.

108. What is humus? What is its function in the soil?

Humus is the decayed organic matter present in the soil formed by the decomposition of dead organism.

Functions :

Humus is the major factor in deciding the soil structure because :

i) it causes the soil to become more porous

ii) it allows water and air to penetrate deep underground to be available to the roots of the plants

109. "Erosion of top soil disturbs the Nitrogen cycle." Justify this statement. Name any two non-leguminous plants which can fix atmospheric nitrogen.

Atmosphereic nitrogen enters plants through its fixation by bacteria present in the root nodules of leguminous plants. Plants get nitrogen salts present in the soil. On death and decay, all living organisms return nitrogen salts to the soil. On death and decay, all living organism return nitrogen salts to the soil affects growth of leguminous plants, loss of nitrogenous salts and thereby disturbs the N_2 cycle.

The non- leguminous plants which can fix atmospheric nitrogen are :

Paraspornia interact with rhizobia to form nitrogen fixing nodules. Actinorhizal plants (e.g. alder and bayberry) in association with Frankia sp (bacteria) form nitrogen fixing nodules.

110. What is Nitrogen fixation? Mention two differences between nitrification and denitrificaiton processes. Name the organisms involved in these processes.

Nitrificaiton fixationis the process of conversion of gaseous nitrogen from the atmospohere into nitrites and nitrates by the action of microorganisms. It converts nitrogen into usable Form for the plants.

Differences:

Nitrification	Denitrification
a) The process of conversion of nitrites to nitrates	a. The process of converting nitrates into free nitrogen
b) This is an intermediate step of nitrogen cycle in which nitrogen is converted into another usable form, e.g. Nitribactor (nitrogen fixing bacteria)	b) This is the last step in which nitrogenis released back into its source, the atmosphere e.g. Pseudomonoas (dentrificaiton bacteria)

111. How is gaseous nitrogen fixed by the plants? What is its significance?

The leguminous plants have root nodules in their roots in which there is symbiotic association of nitrogen fixing bacteria Rhizobium. It can fix atmospheric nitrogen into nitrates

Its significance is that if plants are not supplied by nitrogenous fertilizers, then they can also grow successfully. Moreover, it also helps in circulation of nitrogen in the atmosphere.

112. Where is ozone layer found in atmosphere? What is its importance? Write the harmful effects of UV rays?

Ozone layer is found in the stratosphere zone of the atmosphere.

Importance : Ozone layer absorbs many harmful solar radiations such as ultraviolet (UV) rays, by which it provides protection to our life.

Harmful effects of UV rays: I caused diseases like cataract, inflammatory diseases, cancer, etc.

113. What is meant by the depletion of ozone layer? State Two caused of depletion of ozone layer in the atmosphere?

The destruction of ozone by any chemical or physical means causes thinning of the ozone layer. It is called depletion of ozone layer.

Two causes of depletion of ozone layer are:

a) use of aerosol chlorofluorocarbons and fluorocarbons.

b) smoke of supersonic jet planes also reacts with *ozone.*

Long answer type questions

114. a) Discuss the basic characteristics of a biogeochemical cycle.

b) What is biological fixation? How is it different from nitrification? Give an example of organism involved in reach of these.

a) Basic characteristics of a biochemical cycle.

i) Biochemical cycles operate through soil, water-bodies, air and biotic factors.

ii) It consist of transfer of matter and energy between the different components ofo the biosphere

b) Fixation of nitrogen by bacteria and algae is called biological fixation of nitrogen. In biological fixation, free atmospheric nitrogen is converted into nitrogen compounds whereas in nitrification, ammonia and ammonium slats are converted to nitrites and nitrates by bacteria.

Rhizobium us capable of fixing atmospheric nitrogen. Nitrobactor causes nitrification.

115) a. Differentiate between biodegradable and non – biodegradable substances

b) How is acid rain causing harm to TajMahal?

c) What is Smog?

a) Biodegradable:

i) These can be broken down into simpler substances and easily disposed off

ii) They are safe for the environment.

iii) Micro-organisms helps in decomposing thereby the substances can bereused and can enter the food chain cycle again.

Non-biodegradable :

i) These cannot be broken down into simpler harmless substances in nature.

(ii) They are harmful substances as they are synthetic products.

(b) Acid rain which contains sulphuric Acid reacts with the marbles of Taj Mahal and makes it yellow in colour.

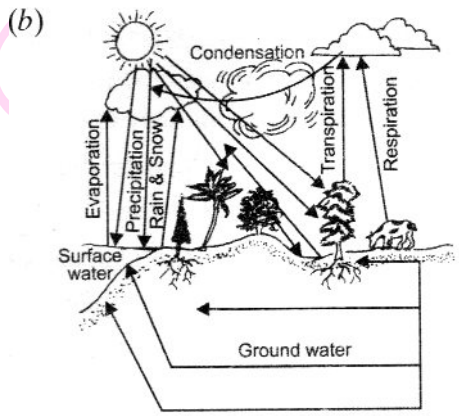
(c) In cold weather, water vapour condenses around unburnt carbon particles or hydrocarbons and lowers the visibility this is called smog.

116. a) What are the consequences of Global warming?

b) Draw a labelled diagram to show water cycle in nature.

c) Why is water essential to life?

a) Due to global warming, temperature on earth is increasing, sea level is rising as snow cover in the mountain peaks of the earth northern hemisphere is decreasing due to melting of snow into water.



Water Cycle in Nature

c) All cellular processes take in a water medium. All the reactions that take place within our body and within the cells occur between substances that are dissolved in water. Substances are also transported from one part of the body to the other in a dissolved from. Organisms need to maintain the level of water within their bodies in order to stay alive. Thus, water is essential for life.

117. Name the two chemicals present in the living organisms having carbon, hydrogen and oxygen as main constituents. State their main function.

Proteins and Nucleic acid contain carbon, hydrogen and oxygen

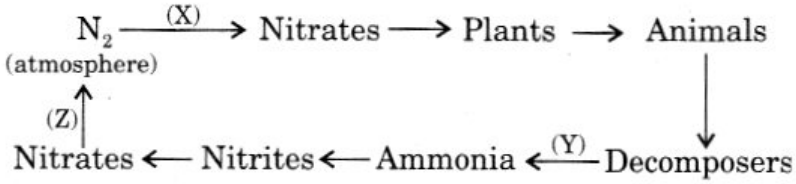
The role of proteins in cell is that they work as enzymes, which catalyze chemical reaction:

Nucleic acids like DNA and RNA carry genetic instructions for making proteins and pass the information onto the next generation.

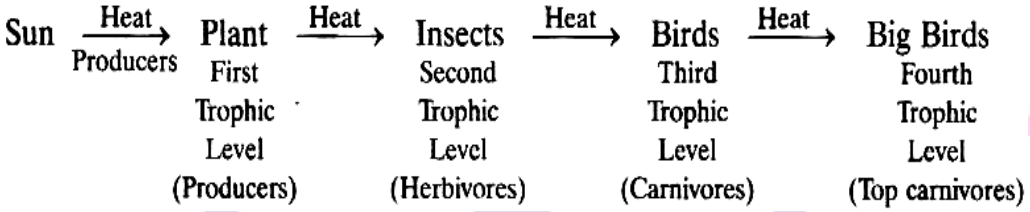
118. a) How does energy enter the biosphere?

b) Name one natural and one man-made process by which CO_2 returns to the atmosphere

c) In the following biogeochemical cycle name and define the processes marked as (X), (Y) and (Z).



a) By the process of photosynthesis, plant in presence of sunlight absorb energy to manufacture food. It is then transferred from one tropic to the other (some heat is also lost in each level)



There is continuous flow of energy from the sun to the living system which is absorbed by the biosphere.

b) One natural process by which CO_2 returns to the atmosphere is by the process of respiration. One man-made process by which CO_2 returns to the atmosphere is combustion of fuels like coal petrol, gas, etc., in industries which release CO_2

c) In the given biogeochemical cycle __

(X) indicates Nitrogen fixation (Nitrification)

Nitrogen fixation is the process which converts atmospheric nitrogen into nitrates, which are soluble in water. This is done by various nitrogen fixing bacteria. E.g. Rhizobium, blue – green algae and bacterium atmosphere

(Y) indicates Ammonification

Ammonification is the process of decomposing complex, dead organic matter into ammonia. This is done by microorganisms living in the soil, e.g. decay bacteria and fungi.

(Z) indicates Denitrification

Denitrification is the process of reducing nitrates present present in the soil to release nitrogen gas back into atmosphere.

119. How does air pollution affect the living beings on earth?

Polluted air caused many diseases and reactions. Some of the effects of different air pollutants are as follows:

a) Dust - Allergic reactions

b) Smoke - Respiratory problems

c) CO - Respiratory problems

d) CO_2 in excess - Greenhouse effect and atmospheric temperature rises

e) SO_2 - Damages lungs, produces acid rain and causes corrosion.

f) Oxides of nitrogen - Lung congestion, produce smog

g) Metal particulates like ;

Lead - Lead poisoning, damages the brain of children

Mercury - Brain damage, mental retardation, paralysis

Asbestos - Lung cancer, Asbestosis

120. Explain how water bodies can handle the pollution to some extent. Give two examples in which pollution has reached such a high level that man has to take steps to replenish the water.

Water bodies can handle the pollution to some extent by cleaning it through its own ecosystem. Microorganisms and algae which thrive in the river, with the help of dissolved oxygen clean the water.

Examples of high level water pollution are :

a) River Ganga : Due to disposal of untreated domestic and industrial waste, pollution level of river Ganga has reached a very high level. In some stretches, the river resembles a drain.

b) Dumping of Crude oil in the English channel : due to cleaning process of crude oil vessels carry dispose crude sludge in the sea that forms a blanket of crude on the water surface which kills and harms the aquatic organisms present there.

121. a) What are the two forms of oxygen found in the atmosphere?

b) Give full form of CFC

c) State two effects of depletion of ozone layer in the atmosphere.

a) The two forms of oxygen found in the atmosphere are :

i) A diatomic molecule having two atoms of oxygen with chemical formula O_2

ii) A triatomic molecule having three atoms of oxygen with chemical formula O_3

b) CFC – Chlorofluorocarbon

c) Two effects of depletion of ozone layer are:

i) UV rays coming to earth's surface may cause skin cancer, cataract and inflammatory diseases.

ii) It may change the gene structure in animals and plants

NCERT

Short answer type questions

1. Rivers from land, add minerals to sea water. Discuss how?

As the river water flows from land, it passes over the rocks. It picks up minerals which get dissolved in the water. Minerals are then carried by the rivers to sea water.

2. How can we prevent the loss of topsoil?

Loss of top soil can be prevented by :

a) checking deforestation

b) preventing excessive grazing by animals

c) increasing the vegetational cover

3. How is the life of organisms living in water affected when water gets polluted?

The life of organisms living in water is affected when water gets polluted in the following ways:

a) Domestic waste carries pathogens of diseases which cause diseases in aquatic animals

b) Fertilizers and pesticides cause eutrophication which reduces oxygen available to aquatic animals

c) Industrial wastes carry toxins that harm the aquatic organisms

4. During summer if you go near the lake you feel relief from the heat why?

Ans. Air above the land gets heated up during day and starts rising and creates a region of low pressure. But the lake does not get heated so quickly and thus, air above the surface of lake moves to fill the area above the land. Therefore, a cold breeze flows from lake to land during summer days, gives relief to people standing near the lake.

5. In costal area, wind current moves from the sea towards the land during day; but during night it moves from land to the sea. Discuss the reasons. [HOTS]

Ans. During day, the air above the land gets heated quickly and starts rising. This creates a region rushes into to fill this area of low pressure. This movement of air from one region to the other creates winds.

6. Following are a few organisms.

a). Lichen **b) mosses** **c) mango tree** **d) cactus**

Which among the above can grow on stones; and also help in formation of soil? Write the mode of their action for making soil [HOTS]

(a) Lichens and b) Moses can grow on stones. Breakdown the stones resulting in the formation of soil. The mode of action here is chemical.

7. Soil formation is done by both abiotic and biotic factors. List the names of these factors by classifying them as abiotic and biotic?

Abiotic factors – Sun, water, wind

Biotic factors – Lichens, mosses, trees, shrubs and hersb

8. All the living organisms are basically made up of C, N, S, P, H and O. How do they enter the living forms? Discuss.

The inorganic substances enter plants through the process of photosynthesis. The inorganic substances enter plants air (CO_2) AND WATER AS IONS BY ABSORPTION OF ROOTS FROM SOIL. Herbivores Eat these plants as food. Carnivores eat herbivores for survival. Thus, all organisms are basically made up of C, N, S, P, H and O. which pass from plants to others organisms.

9. Why does the percentage of gases like oxygen, nitrogen and carbon dioxide remain almost the same in the atmosphere?

Gases maintain consistency in the atmosphere through biogeochemical cycling where there is repeated circulation of biogenetic nutrients between biotic and abiotic components of the environment.

10. Why does moon have very cold and very hot temperature variations, i.e., from – 190^0 C to 110^0 C even though it is at the same distance from the sun as the earth?

Due to absence of atmosphere on the moon, it gets heated up as soon as sun rays falls on its surface and cools down immediately when there is no sunlight.

11. Why do people love to fly kites near the seashore?

Ans. Due to the regular unidirectional wind from sea to land, it helps the kite to fly high and the wind also provides comfort by making the seashore cool during daytime.

12. Why does Mathura refinery pose problems to the Taj Mahal?

Mathura refinery releases toxic gas (like oxides of sulphur) which causes acid rain and hence causes corrosion of the marbles of Taj Mahal. Thus Mathura refinery poses problem to Taj Mahal.

13. Why do lichens not occur in Delhi whereas they commonly grow in Manali or Darjeeling?

Lichen is a bio-indicator and sensitive to SO2. Pollution from automobiles. Delhi has maximum number of automobiles, hence has a highly polluted environment. But in Manali and Darjeeling, the atmosphere is humid and sulphur dioxide pollution is low and so lichens grow there easily.

14. Why does water need conservation even though large oceans surround the land masses?

Marine water is unfit for human and plant consumption. So, the terrestrial organisms have to depend on freshwater resources, Therefore, limited freshwater resources need conservation to cater to the demands.

15. There is mass mortality of fishes in a pond. What may be the reasons?

There is mass mortality of fishes in a pond because of:

a) Throwing of industrial waste.

b) flow of pesticide rich water from crop fields.

c) thermal pollution

d) addition of poisonous (mercury) compounds in water

e) blockage of fish gills with water pollutant.

16. "Soil is formed by water" If you agree to this statement then give reasons.

Yes, soil is formed by water in following ways

a) Water causes 'Wear off' and 'tear off' rocks over a long period of time

b) it also causes the rocks to rub against other rocks creating small particles which are token away downstream and deposited as soil.

c) Water expands on freezing in crevices and crack of rocks that breaks the rocks into smaller pieces.

17. Fertile soil contains of humus which is useful to soil and plants. Why?

a) it is required for binding soil particles

b) it makes the soil porous for easy passage of roots

c) it is the source of minerals,

d) it contains substances that promotes growth and development of plants.

18. Why step farming is common in hills?

Step farming is common in bills to slow down the speed of rainwater currents and increasing the water absorption by soils, This is practiced to check soil erosion through water cure the slopes.

19. Why are root nodules useful for the plants?

Root nodules occur in legume plants. In root nodules, nitrogen fixing Rhizobium bacteria are present which increases the soil fertility. These bacteria picks up nitrogen from soil and converts it into organic compound. The roots absorb the organic compound and it is passed into plants and so legume plants become rich in proteins and other nitrogen compounds.

Long answer type questions

20. How do fossil fuels cause air pollution?

a) Burning of fossil fuels like coal and petroleum releases oxides of nitrogen and sulphur. Inhalation of these gases is dangerous. These gives also dissolve in rain to five rise to acid rain

b) The combustion of fossil fuel also increases the amount of suspended particles in air. These suspended particles could be unburnt carbon particles or substances called hydrocarbons. The presence of high levels of all these pollutants, reduce visibility. In cold weather where water also condenses out of air forming smog, Smog is an indication of air pollution.

21. Discuss how you can contribute in reducing water pollution.

We can contribute in reducing water pollution as follows :

a) The sewer line should not be directly connected to the water body.

b) We should not throw our garbages or domestic waste in the water body

c) We should prevent dumping of toxic compounds in the water bodies

d) Washing of clothes should be avoided near water bodies as it adds a lot of detergents to it.

e) We should plant trees, shrubs and herbs near the banks of the river to check soil erosion.

22. A motor car with its glass totally closed is parked directly under the sun. The inside temperature of the car rises very high. Explain why?

Glass being transparent allows sunlight to pass through it, hence heating the interior the car. Since heat waves cannot pass out of the glass, so the heat trapped inside raises the temperature of the interior. This is because glass is transparent to infrared radiation coming from the sun that is have shorter wavelength than that emitted by the interior of the cars longer wave length to which the glass is opaque. Therefore heat from the can cannot move out.

23. Justify "Dust is a pollutant"

Dust is a pollutant because:

a) its present in air as suspended particles can cause allergy and other respiratory diseases

b) it also affects plant growth, by covering stomata on leaf surface.

c) it acts as the carrier of toxic compounds like heavy metals.

d) dust particles are eye irritants.

e) it settles over plant foliage and reduces photosynthetic activity.

24. Explain the role of the sun in the formation of soil

The role of the sun in the formation of soil is as follows.

The rocks are heated by sun during daytime which makes them expand. At night after the sunset, the rocks cools down which makes them contract. This process of alternate expansion and contraction takes place everyday which result in cracks in the rocks and ultimately breaks it down to smaller particles which forms soil.

25. Carbon dioxide is necessary for plants. Why do we consider it as a pollutant?

CO_2 is considered as a pollutant because the increasing concentration (more than normal) of $CO_2\ is\ harmful.$ So apart from CO_2 being essential for photosynthesis, it is also a greenhouse gas. Higher concentrations Of CO_2 is one of the causes of green house effect and global warming.

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