Adaptations in Dirrerent Ecosystems

Improve your learning

Q. 1. What do you understand by adaptations in organisms and why do they adapt? (AS 1)

Answer : An adaptation of an organism is the modification or change in the organism's body or behavior that helps it to survive. Animals adapt to their environment so that they can perform a task easily or to provide them with higher chances of survival.

Q. 2. With the help of two examples, explain how these organisms have adapted themselves in the ecosystem? (AS1)

Answer : The desert being a harsh environment, organisms in a desert ecosystem adapt to survive the intense heat and limited water. Each organism has a unique system for survival, and some of the ways desert plants adapt are similar. Necessity for any organism that is to survive in the harsh desert climate is water.

Plants have adapted in a number of ways that help them accumulate water. Plants in desert ecosystems are mostly grow near riverbeds. Whether dry or wet, these areas often contain water underground and plants are more likely to survive if their roots can reach a reliable water supply. These are also the most likely places for water to accumulate in the case of rain.

When the water comes, the plants will be there to receive it. Fog is also a reliable water source in deserts where the conditions are right for it. Air condenses to form dew in the cool mornings. The dew is captured on the plant’s leaves and hairs. Many desert plants have vast root systems, capable of reaching deep, otherwise unusable water supplies under the dry soil.

Some trees such as the mangroves and cypress have evolved curious ways to deal with the problems of growing in a wet waterlogged and salty place. They have evolved to have projections from their roots called pneumatophores, or ‘knees’.

These “knees” develop from the lateral roots that grow near the surface and protrude up to about 12 inches out of the soil or sediment. The precise function of these “knees” is not known, but there is general agreement that they aid the plants in maintaining adequate root respiration in a watery environment.

Q. 3. Collect some aquatic plants- cut the leaves and stems Observe them under microscope and record your observations like air presence /absence of air spaces etc. and answer the below. (AS 3)

a) Why do they float on water?
b) What make them float?

c) Are there any other reasons for their floating?
d) Draw a diagram of what you have observed under microscope?

Answer : a) They float in water due to the presence of air filled spaces in them.

b) Leaf bases of water plants form air filled structures to keep them afloat.

c) Partially submerged plants have numerous air spaces inside the stems leaves, roots that aid in gaseous exchange and buoyancy. This amplifies the buoyant force of the water making them float.

d) NOTE: To draw the diagram you must observe a cross-section of the plant stem under light microscope after staining it with safranin dye. Draw and label all the structures that can be observed.

Q. 4. What special adaptations can be seen in the following organisms? (AS1)

a) Mangrove trees
b) Camel
c) Fish
d) Dolphins
e) Planktons

Answer : a) Mangrove trees – pneumatophores or knees, the lateral outgrowth of roots, for breathing

b) Camel – hump (fat storage), long eyelashes (protects from sand), long legs (keeps the body away from hot sand), nostrils (voluntary breathing for protection from sand).

c) Fish – fins for swimming.

d) Dolphins – floaters (special structures in the digestive canals) to enable them to inhabit certain levels in the water.

e) Planktons – droplets of oil in the cells to keep them afloat.

Q. 5. If an animal of euphotic zone has to survive in abyssal zone, what adaptations are required to survive there? (AS1)

Answer : If an animal of euphotic zone has to survive in abyssal zone, it should be heterotrophic as no light is present in abyssal zone and animal should be red coloured as red is the colour of highest wavelength.

Q. 6. Marine water fishes drink more water than fresh water fishes. Do you agree? Justify.

Answer : Yes, marine water fishes drink more water than fresh water fishes as in the ocean saline water is there so the osmotic potential of the water is less than that of marine livestock so the water enters more to attain equilibrium where no more water enter into the body. So we can say the marine bodies take more water than a fresh water fish but not drink as water only helps them for respiration.

Q. 7. Visit a nearby pond or a lake. Record the organisms you have observed and their adaptations? (AS 4)

Answer : The adaptations observed in river ecosystem are:

i. Fishes: They have fins to dive and gills respire.

ii. Frogs: They have legs to move in water.

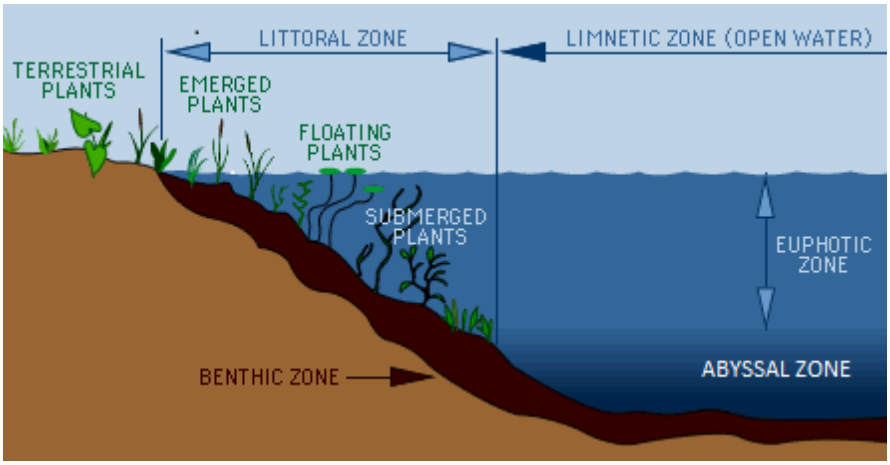
iii. Tadpoles: They have small legs to move in water and also gill to respire.

iv. Turtles: They have legs to move by pushing the water back.

v. Snakes: They have a slippery body to move easily by slithering.

Q. 8. Draw a lake showing different zones. Why are they called so? (AS 5)

Answer : The different zones are as follows:



Euphotic zone: The organisms that most reside here are floaters and swimmers having shiny bodies. Plants are green and photosynthetic. Nearly 80% of the flora and fauna are found in this zone.

Bathyal zone: This zone is dark and cold throughout the year and is devoid of photosynthetic organisms. The animals found here are mostly deep-sea predators.

Abyssal zone: Most of the plants that are seen here are red or brown in colour and animals have tubular or flat bodies.

Q. 9. Collect information of one lake from internet and prepare a table of organisms adapted at different zones? (AS 4)

Answer :

Oceanic zones	Organisms
Euphotic zone	Planktons, dolphins, flying fish, green turtles, etc.
Bathyal zone	Whales, lantern fish, red/brown kelps (algae), sponges, octopus, corals, etc.
Abyssal zone	Brittle starfish, angler fish, tripod fish, etc.

Q. 10. Write the effect of temperature on the organisms adapted in a lake and pond in a tabular form. (AS1)

Answer : Most of the organisms that are affected by the change in temperature are poikilothermic animals. The external temperature of their surroundings affects their internal temperature and thus, causes changes in their metabolic activities.

Organisms which can tolerate a wide range of temperatures are called as Eurotherm and the organisms that have a narrow tolerance range of temperatures are called as stenotherms. Many aquatic animals tend to change their colour with changes in the temperature. The animals that are active during the cold season are usually dark in colour.

i. As the temperature of water goes down to 4°C, the density of water decreases. So, this causes a decrease in the buoyancy of the plankton and they tend to sink with increasing temperature of the water.

ii. The reproductive life of the fishes is most commonly affected by the temperature changes. Trout fish reproduces at a temperature of 3 - 14°C. However, when the temperature is above 24°C, it becomes lethal for the fish.

iii. The optimal growth temperature of Carp fish is in between 20 - 30°C.

Q. 11. Amphibians are wonderful creatures on the earth. How do you appreciate their adaptation? (AS 6)

Answer : Amphibians like frogs are wonderful *creatures present on earth*. They start their life in water and ar*e adapted to survive in water. For example,* they breathe through gills in tadpole stage. *When it reaches* adult stage they undergo metamorphosis

and adapt themselves to live in water and also on land. This proves *the* link between aquatic and terrestrial animals.

Q. 12. Some animals and plants survive only in certain conditions. Now a days, human activities cause damage to these conditions. What do you think about this? (AS7)

Answer : Yes, some animals and plants survive only in certain conditions. Such as, the polar bear hibernate in winter and becomes inactive which survive in the Polar Regions. Though nowadays the winter is vanishing because of global warming and increases the temperature throughout causing the polar bears to become endangered.

Q. 13. In the chapter on ecosystem, we had studied about the mangrove ecosystems. What kind of abiotic conditions did you study in them? (AS1)

Answer : The abiotic or climatic factors are as follows:

i. Temperature: ranges between 20 – 35^{o}C.

ii. Rainfall: Abundant rainfall evenly distributed throughout the year.

iii. Wind flow: The wind flow has drying power of the air and its mechanical effects may cause damage such as cyclones.

iv. Soil: The soil found is saline hydromorphic and have very little humus having silts.

Q. 14. How is the Coringa ecosystem different from the marine ecosystem you studied?

Answer : The Coringa ecosystem is found in the Godavari River which is a fresh water ecosystem. Marine water ecosystem is salt water ecosystem such as found in oceans. Marine water ecosystem covers two-third of the surface of the earth. Coringa ecosystem is the largest ecosystem is one of the largest ecosystems in India.

Q. 15. Are there any rivers meeting in the Bay of Bengal in the Coringa ecosystem collect information and make a note on them? (AS 4)

Answer : The Coringa ecosystem is formed at the junction of two rivers Gowthami and Congo. The Congo River brings fresh water to the ecosystem and the Gowthami River brings saline water to the ecosystem.

Q. 16. The aquatic ecosystem of Coringa mangrove region would be less salty than the bay. Do you agree to this why? Why not? (AS1)

Answer : Yes, the aquatic ecosystem of Coringa mangrove region would be less salty than the bay. This is because Coringa ecosystem is formed at the junction of two rivers

Gowthami and Congo. The Congo River brings fresh water to the ecosystem and the Gowthami River brings saline water to the ecosystem. Thus, the salinity of the water in this ecosystem is reduced due to the presence of fresh water.

Q. 17. The Murrel (korramatta) and Rohu are fishes found in rivers. Will they be able to live in the Coringa ecosystem? Give reasons for your answer. (AS 2)

Answer : The Murrel (korramatta) and Rohu are fishes found in rivers. The Murrel and Rohu will live in Coringa ecosystem because as they are freshwater fishes so they can easily live there.

Q. 18. Crocodile, alligator is both the same? Actually, they are not similar. Do you find any differences between them? What are they? (For this you need some references. Please go through your library.) (AS 4)

Answer : It is not easy to tell the difference between an alligator and a crocodile. To the untrained eye, both look similar, but there are some differences you can use so you don't mix up their identities.

i. Alligators are generally shorter than crocodiles. In general alligators grow about 4.8 meters whereas crocodiles can grow very large near about 10 meters long.

ii. The head of alligator is shorter and broader than crocodiles. Crocodiles are mainly found in Africa, Asia and Australia.

iii. Alligator possess wide and U-shaped snouts which are curved from corners whereas Crocodiles have sharp and V-shaped snouts.

These are the main differences that can easily help one to make difference between two of them.