

The Living World: Adaptations and Classification

EXERCISE [PAGE 9]

Exercise | Q 1 | Page 9

Find my match

'A' Group	'B' Group
(1) Lotus	(a) Flower and leaves attract insects
(2) Aloe	(b) Haustorial roots for the absorption of food
(3) Cuscuta	(c) Adapted to live in deserts
(4) Venus flytrap	(d) Adapted to live in water

Solution:

'A' Group	'B' Group
(1) Lotus	(d) Adapted to live in water
(2) Aloe	(c) Adapted to live in deserts
(3) Cuscuta	(b) Haustorial roots for the absorption of food
(4) Venus flytrap	(a) Flower and leaves attract insects

Exercise | Q 2 | Page 9

Read the paragraph and answer the following questions.

I am a penguin. I live in polar region covered by snow. My abdomen is white. My skin is thick with a layer of fat underneath. My body is spindle-shaped. My wings are small. My toes are webbed. We live in flocks.

1. Why is my skin white and thick and why is there a thick layer of fat underneath?
2. Why do we live in flocks sticking close to each other?
3. Which geographical region do I inhabit? Why?
4. Which adaptations should you have to enable you to live permanently in the polar region? Why?

Solution:

1. Having black and white skin is a type of adaptation known as camouflaging. It is called counter-shading and makes it harder for both the predators and the prey to

see penguins from all sorts of angles. The white chest of penguin protects them in the water by camouflaging them from being seen from below against the lighter sky coming through the water's surface. Their black backs help them blend in with the darker, deeper ocean waters below them, thus protecting them from their predators. They have a thick layer of fat because it keeps them warm under such extreme cold conditions.

2. We know that penguins live in the coldest regions of earth and in order to find warmth and solace they remain in flocks with each other. In order to escape the extreme cold conditions, they nestle together to keep each other warm.
3. Penguins are found in regions of Antarctica, South America, Africa and Australia. Many species can also be found in New Zealand and the sub-Antarctic islands.
4. The following adaptations are required to survive in polar regions:
 - black and white skin with a thick layer of fat beneath it
 - skin should be covered with feathers
 - small body with small wings
 - presence of strong muscles in chest and wings

Exercise | Q 3 | Page 9

Who is lying?

1. Cockroach – I have five legs.
2. Hen – My toes are webbed.
3. Cactus – My fleshy, green part is a leaf.

Solution: The cockroach is lying because it has six legs and not five.

The cactus is also lying because its fleshy, green part is a stem and not a leaf.

Exercise | Q 4.1 | Page 9

Read the following statement. Write a paragraph about adaptation with reference to the statement.

There is extreme heat in deserts.

Solution: There is extreme heat in deserts and dry conditions prevail in this region. The animals and plants which are found in this region have special modifications which help them to survive in such environment. For example, cactus and acacia plants withstand hot and dry environment of the desert with the help of various modifications. They have a thick cuticle on their leaf surface and their stomata are arranged in deep pits to minimise water loss by transpiration. They have a special photosynthetic pathway, CAM in which stomata remains closed during day time. Their leaves are reduced to spines to minimise water loss, and photosynthetic functions are performed by flattened stems.

Similarly desert animals have adaptive features like- thick skin to prevent the loss of

water, long legs with flat and cushioned soles, long and thick eyelashes and nostrils which are protected by folds of skin.

Exercise | Q 4.2 | Page 9

Read the following statement. Write a paragraph about adaptation with reference to the statement.

Grasslands are lush green.

Solution: Grasslands are lush green due to the presence of diverse types of bushes and grasses. Grasses are tall so that animals like tiger, lion, elephant can remain hidden in them. Animals which are found in grasslands have adaptations like strong legs to run fast and capture their prey, claws, sharp and pointed canine. The herbivores which are found in this region have eyes below the forehead which gives them wide angle vision which protects them from predators.

Exercise | Q 4.3 | Page 9

Read the following statement. Write a paragraph about adaptation with reference to the statement.

Insects are found in large numbers.

Solution: Insects are found in large numbers because they have developed mechanisms which help them to survive even in harshest of environment. They are found in extreme conditions of deserts and Antartic region due to these modifications. For example grasshopper have long, strong hind legs that help them jump, house flies have sponging mouthparts to slurp up food, stinky bugs and walking sticks have the ability to camouflage.

Exercise | Q 4.4 | Page 9

Read the following statement. Write a paragraph about adaptation with reference to the statement.

We hide.

Solution: There are certain species which are able to hide themselves by blending their colour with that of the surrounding. This adaptive mechanism is termed as camouflage and is a method to protect oneself from the predators and prey. For example, grasshopper, lizards, butterflies, chameleon, frogs etc.

Exercise | Q 4.5 | Page 9

Read the following statement. Write a paragraph about adaptation with reference to the statement.

We have long ears.

Solution: Animals with long ears are found in grasslands. It is an adaptive mechanism which enables them to receive sounds from long distances and from different directions. Another important function of long ears is that they act as a cooling system.

The large ears have thin skin and contain an extensive network of blood vessels that provide a large surface area for heat exchange. These vessels swell when the animal is hot to allow the blood to cool and contract when temperatures drop to conserve heat.

Exercise | Q 5.1 | Page 9

Answer the following.

Why is the camel called the 'Ship of the desert'?

Solution: Camel is called the "Ship of Desert" because it is the only means of transport found in deserts. The body of a camel has undergone various modifications that help it to survive in the hot and dry conditions of the deserts.

- Camels have very long legs that help them to walk in the sand and prevent the heat of the sand from reaching their bodies.
- They have a prominent back or hump. It stores food which helps it to survive without food in the deserts for several days.
- Another important adaptation that helps the camel to survive in the desert is its ability to conserve water. They do not sweat and excrete only small amounts of water through urine. The camel dung is dry and devoid of water.
- All this helps the camel to conserve water and enables them to live without water for several days.

Exercise | Q 5.2 | Page 9

Answer the following.

How can the plants like cactus and acacia live in deserts with scarce water?

Solution: Cactus and acacia plants withstand hot and dry environment of the desert with the help of various modifications. They have thick cuticle on their leaf surface and their stomata are arranged in deep pits to minimise water loss by transpiration. They have special photosynthetic pathway, CAM in which stomata remains closed during day time. Their leaves are reduced to spines to minimise water loss and photosynthetic functions are performed by flattened stems.

Exercise | Q 5.3 | Page 9

Answer the following.

What is the inter-relationship between adaptations of organisms and their surroundings?

Solution: Adaptation is defined as the modification or change in the organism's body or behaviour that helps it to survive in a particular environment. The environment in which an animal survives consists of many different things and it must learn to adapt to each of these factors in order to survive. These factors can be in the form of climate, the kinds of food plants that grow in it, other animals that may be predators or competitors etc. This fact is evident from the following examples:

- Cactus has thick cuticle on their leaf surface and their stomata are arranged in deep pits to minimise water loss by transpiration. They have special photosynthetic pathway, CAM in which stomata remains closed during day time. Their leaves are reduced to spines to minimise water loss, and photosynthetic functions are performed by flattened stems.
- Camels have very long legs that help it to walk in the sand and prevent the heat of the sand from reaching their bodies. The camel has a prominent back or hump. It stores food which helps it to survive without food in the deserts for several days.

Exercise | Q 5.4 | Page 9

Answer the following.

How are organisms classified?

Solution: The hierarchy of classification was developed by Carolus Linnaeus. It refers to the organisation or classification of organisms in the order of rank or importance. According to this system, kingdom is the highest rank. It is divided into phyla or divisions, which are further subdivided into classes. Further divisions include order, family, genus and species, in that order. Thus, species is the basic unit of classification.