F. Give reasons for the following:

1. Plants of tropical rain forest has large leaves.

Answer: The ***trees grow very tall in tropical rainforest***. Very ***little sunlight falls on the ground*** of the forest. So, ***plants that grow near the ground*** have ***broad leaf blades*** to capture ***as much sunlight as possible.***

2. Lotus plants have poorly developed roots.

Answer: ***Lotus is an aquatic plant.*** It grows in ponds or lakes. It does not need a well-developed root system because there is ***enough water in its surroundings.*** It can ***easily absorb water through its short roots***.

3. A camel has exceptionally long large intestine.

Answer: They are ***adapted to survive a long time without water and food***. They have an ***extremely long large intestine*** that ***absorbs every last drop of water*** from the foods they eat.

4. Stomata are present on the upper surface of lily leaves while they are altogether absent in tape grass.

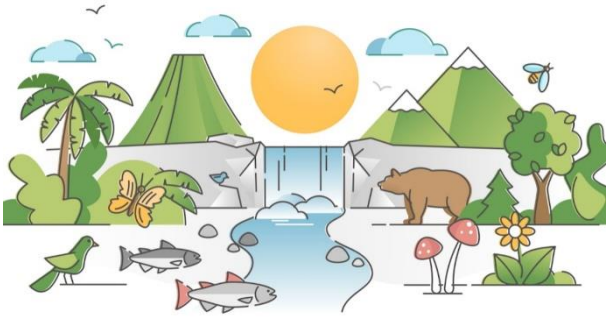
Answer: They help the leaves to ***take in carbon dioxide from air, during the process of photosynthesis***. Thus, ***the leaves of water lilies have stomata on their upper side***, where they ***easily get air*** and usually ***do not come in contact with water***. (Usually, stomata are present more abundantly on the lower surface when compared to the upper surface of leaf)

5. Yaks have thick flurry skin.

Answer: Yak have thick fur so as to ***save them from the extremely cold temperature*** of the cold regions. It acts as an ***insulator and traps heat*** which makes them feel warm in the biting cold.

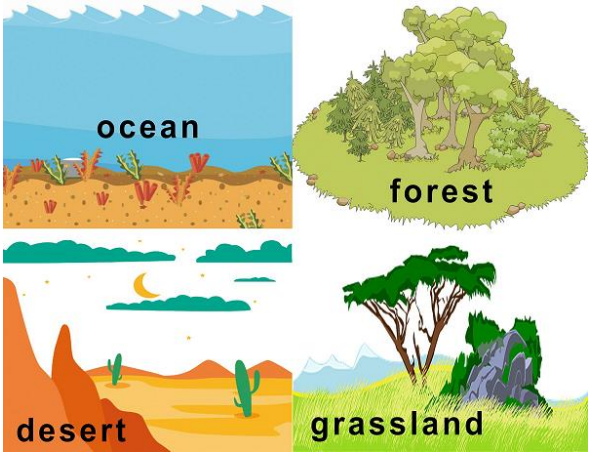
G. Answer the following question:

Q1. Define the following:



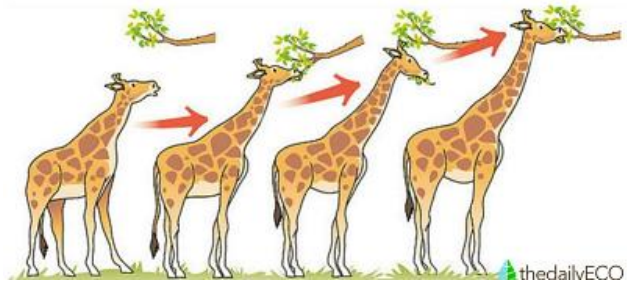
a. Ecosystem: Ecosystem is a ***community of living and non-living things*** that work together.

(***Just for reference:*** *An ecosystem includes all of the living things (plants, animals, and organisms) in a given area, interacting with each other, and also with their non-living environments (weather, earth, sun, soil, climate, and atmosphere*).



b. Habitat: A habitat is a ***natural environment*** where an organism ***lives***.

(***Just for reference:*** *It is basically the address of an organism. Different plants and animals live in different habitats. For example, the habitat of a frog species is fresh water, while the habitat of a camel is a desert.)*



c. Adaptation: The ability of living organisms to adjust themselves to their surroundings is called adaptation.

(Just for reference - *Adaptations are the changes in structure or behaviour of an organism that will allow the organism to survive in that habitat*)

Q2. List a few adaptive features of a lion that helps it in hunting.

Answer: Adaptations of a lion:

1) The ***colour of the body is slight brown*** which helps in ***hiding from the prey***.
2) The ***eyes*** are ***located in the front*** which ***enables better vision***.
3) The ***strong paws and claws*** help in ***holding prey and tearing the flesh.***

1 **2** **3**

Q3. A plant' x' has needle like waxy leaves, plant 'y' has spiny leaves and a well-developed root system, whereas plant 'z' has ribbon like leaves with numerous air spaces in the body tissue? Identify the habitats of plants "X","Y" and "Z" based on the hint provided.

Answer:

Plant 'X' has needle-like waxy leaves. This is an adaptation to reduce water loss through transpiration, which is common in plants living in cold or dry environments. So, plant 'X' likely lives in a ***cold or dry habitat, such as a coniferous forest or a desert***.

Plant 'Y' has spiny leaves and a well-developed root system. Spiny leaves are an adaptation to deter herbivores, and a well-developed root system helps the plant to absorb water efficiently. This suggests that plant 'Y' lives in a ***dry environment with limited water availability, such as a desert.***

Plant 'Z' that grow in water (aquatic plants). Mostly submerged aquatic plants possess narrow and thin ribbon-like leaves. In flowing water, these leaves can easily bend. These leaves are usually divided, allowing water to flow freely without destroying them.

Q4. How are grazing animals like deer adapted to escape their predators?

Answer: Deers have the following adaptation for forest and grassland habitat:

- They have ***long ears*** to ***hear*** the ***movements of the predator***.
- The eyes on the sides of their head allow them to ***look in all directions for danger***.
- ***Their speed*** helps them to ***run away from predators***.

Q5. What are aerial plants? With the help of two examples, discuss the adaptations that they exhibit?

Answer: Aerial plants are ***plants that do not have underground root systems***; instead, they are located in areas above the ground.

(***Just for reference -*** *The plant that does not required soils to grow is called aerial plant*)

Aerial plant adaptation:

1. Some aerial plants such as epiphytic orchids ***have thick, waxy or leathery leaves***. The ***waxy layer does not allow water loss*** (through transpiration) but ***allows the sunlight to pass through it*** for plant to ***perform photosynthesis***.

2. Formation of ***breathing roots and prop roots*** from aerial plants.

Breathing roots:

The plants grow where ***enough oxygen*** is ***not present in the soil***.

These ***roots*** have ***minute pores through which exchange of gasses*** occur with the atmosphere and ***hence they are called breathing roots***.

Mangrove is an ***example*** of a ***plant with breathing roots***.

Prop roots:

Some ***aerial plants*** have ***roots developing*** from the ***main stem of the plant*** and ***associated branches.***

These ***roots prop up*** the branches and provide ***support to the plant acting like ropes and pillars*** and ***hence are called prop roots.***

Banyan and Indian rubber plants are examples of plants having prop roots.

Q6. What type of habitat is a conifer likely to found in? Enlist its adaptive features.

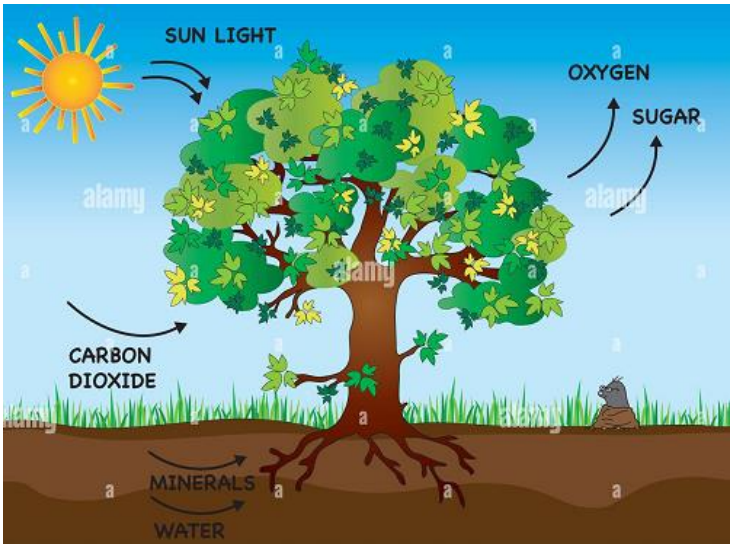
Answer: They have ***several adaptations*** that ***help*** them ***grow in colder, drier conditions***.

- The ***needle like leaf are heavily cutinized*** (covered with a protective, waxy coating that slows water vapour loss) ***reduce the surface area of its exposure.***
- Presence of ***sunken stomata*** to ***preserve water loss***

Thus, sunken stomata along with waxy coating on leaves, helps minimize water loss through transpiration.

Q7. What are adaptations? How are trees beneficial for living organisms? Give two examples to explain.

Answer: ***Adaptations*** are ***special body parts or behaviours*** that ***help a living thing survive in an environment.*** It is an ***evolutionary process***. Organisms show adaptation according to their habitat.



- ***Trees reduce wind speeds and cool the air*** as they lose moisture and reflect heat upwards from their leaves. Moreover, ***they help cool our atmosphere***. It's estimated that trees can reduce the temperature in a city by up to 7°C.
- Trees ***food-making process, photosynthesis***, involves ***absorbing carbon dioxide*** from the ***air and storing it in its wood***, helps ***slow the rate of global warming***. Trees ***release oxygen*** which we ***need for our life***.
- Trees are the ***sources of food for humans and animals***. Also, they provide ***food for birds, animals and human beings*** in the form of ***leaves, vegetables, fruits and roots***. They also provide shelter to many birds and animals like a home.

Extra points (just for knowledge)

- Trees and plants are the sources of many supply life-saving drugs.
- They prevent land erosion and guard us against pollution. Thus, trees keep up the ecological balance.

Q8. What are the special features of grasses found in grasslands? Name two commonly grasses found in the region?

Answer: Grasslands are areas dominated by grasses, where rainfall is not enough to support the growth of trees. Grasslands occur where rainfall is usually low and/or the soil depth and quality is poor.

1) These grass have a well-developed root system.
2) These grasses have pollen spread by the wind and not depend on other pollinators.
3) Presence of thin leaves prevents water loss.

4) The stalk leaves are flexible to withstand strong wind currents.
5) Grasses can go dormant, or stop growing leaves, seeds, and roots until spring, to survive their tough environment.

Two example of these grass are Dogbane and Milkweeds.

Q9. If an organisms fails to adapt to its environment, what could be the possible consequences.

Answer: ***Not all species manage to adapt successfully***. When organisms ***cannot cope with the demands of a new environment*** or ***fail to relocate to a more suitable habitat, they face extinction.*** Extinction marks the end of a species, as it can no longer handle the challenges posed by its surroundings.

In essence, ***adaptation*** becomes ***a critical factor in determining the survival or demise of a species*** in the face of environmental changes.

Q10. Lions and deers are found in grasslands. Both have remarkable speed. What is the significance of speed in grasslands?

Answer: Speed is crucial for survival in the grasslands for animals that stay there.

Adaptation in deer:

- Grasslands are regions with abundant grass populations.
- Due to the absence of big trees, the chances of catching prey by a predator are quite high.
- Therefore, ***deer adapt themselves by increasing their speed to escape the predators and thus protect themselves.***
- The increased speed of the animal provides a chance of survival to the weakest class of animals in the grasslands.

A lion's grassland survival adaptation example:

- The skin of the lion is grass yellow.
- They have a keen sense of smell, which helps them locate their prey.
- ***They have strong leg muscles that allow them to chase down prey fast.***

Alternate answer:

In grasslands, mainly grasses are found and there are very few trees or places for animals to hide. Predators such as lion, tiger, etc. are commonly found in such habitats. It is very easy for the predators to locate their prey in the grass. Therefore, ***to protect themselves from being predated, the herbivores like the deer, zebra etc are adapted to running fast so as to protect themselves from being predated. So, speed is important for survival in the grasslands for animals that live there.***

Q11. The tables below provides some information on three different types of organisms - A, B and C.

Organisms	Information
A	• Lives in grassland • Feeds on small animals
B	• Small plant • Grow in the rain forest
C	• Lives in cold environment • Inhabits rock mountains

Which one of the following shows the correct adaptation of the organisms A, B and C ?

	A	B	C
1	• **Skin colour matches surroundings** • **Has good night vision**	• Has needle like leaves • Has swollen stem	• Has strong hoofs • Covered by a thick hairy coat
2	• Has good night vision • Brightly coloured	• Has a flexible stem • Has a small thin leaves	• Has sharp claws • Has a fatty layer
3	• Has sharp claws • Has a good night vision	• **Has a large leaves** • **Leaves have a drip tips**	• **Has a strong hoofs** • **Covered by thick hairy coat**
4	• Has a streamlined body • Has sharp claws	• Has a well-developed root system • Leaves are small and narrow	• Has long ears • Has a webbed feat

Q12. Penguins are adapted to bear the cold. Their body structure helps them to keep warm. What is behaviour seen in penguins?

Answer: A typical behaviour of penguins that helps them to keep warm is that penguins have a tendency to remain together in groups.

- Penguins have to ***keep high body temperatures to remain active***. They have ***thick skin*** and ***lots of fat (blubber) under their skin*** to ***keep warm in cold weather.***
- They also huddle together in group to keep warm. ***Emperor penguins have developed a social behaviour that when it gets cold, they huddle together in groups that may comprise several thousand penguins.***

- The dark coloured feathers of a penguin's back surface absorb heat from the sun, so helping them to warm up too.

(Emperor *penguins hurdling in a group)*

Q13. How the narrow and long leaves help tape grass to remain submerged in water?

Answer: The narrow and long leaves of tape grass ***allows the plant to resist the damaging effects of water currents***. This ensures that the ***plant survives in spite of strong water currents***.

Some submerged aquatic plants have ***narrow ribbon-like leaves***, so that they can ***easily bend with flowing water***. This provides least resistance to the flow of water so ***they won't get damaged or torn easily.***

(Just for information: The aquatic plants surface cells are capable of absorbing water, nutrients, and dissolved gases in the water. Plants that live completely under water gather carbon dioxide from the water. No other pores like stomata is required for this. Hence aquatic plants don't have stomata)