# Chapter 2: Diversity in the Living World

## Exercises — Let Us Enhance Our Learning

Q1 Here are two types of seeds. What differences do you find among the roots and leaf venation of their plants?
(a) Wheat
(b) Kidney beans

SOLUTION

Wheat is a monocot seed (one cotyledon). Monocot plants have fibrous roots and parallel venation in their leaves.
Kidney beans are a dicot seed (two cotyledons). Dicot plants have a taproot system and reticulate (net-like) venation in their leaves.
So the two plants differ in both root type (fibrous vs taproot) and leaf venation (parallel vs reticulate).

Answer: Wheat: fibrous roots + parallel venation. Kidney beans: taproot + reticulate venation.

Q2 Names of some animals are given below. Group them based on their habitats. Write the names of aquatic animals in the area marked 'A' and terrestrial animals in the area marked 'B'. Enter the names of animals living in both habitats in part 'C'.
Horse, Dolphin, Frog, Sheep, Crocodile, Squirrel, Whale, Earthworm, Pigeon, Tortoise

SOLUTION

A (Aquatic — live in water): Dolphin, Whale.
B (Terrestrial — live on land): Horse, Sheep, Squirrel, Earthworm, Pigeon.
C (Both habitats): Frog, Crocodile, Tortoise.
Frogs are amphibians — they live in water as well as on land. Crocodiles and tortoises are also found in both water and on land.

Answer: A (Aquatic): Dolphin, Whale. B (Terrestrial): Horse, Sheep, Squirrel, Earthworm, Pigeon. C (Both): Frog, Crocodile, Tortoise.

Q3 Manu's mother maintains a kitchen garden. One day, she was digging out radish from the soil. She told Manu that radish is a kind of root. Examine a radish and write what type of root it is. What type of venation would you observe in the leaves of radish plant?

SOLUTION

Radish is a dicot plant. Dicot plants have a taproot system — one main root with smaller side roots branching from it.

The radish we eat is actually a modified taproot that stores food.

Since radish is a dicot, its leaves have reticulate (net-like) venation.

Answer: Radish has a taproot system. Its leaves show reticulate venation.

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Q4 Look at the image of a mountain goat and a goat found in the plains. Point out the similarities and differences between them. What are the reasons for these differences?

(a) Mountain Goat

(b) Goat found in the plains

SOLUTION

Similarities: Both are goats — they have four legs, a similar body shape, and eat plants.

Differences: Mountain goats tend to have thicker fur/coat to withstand cold temperatures, and their hooves are adapted for gripping rocky mountain surfaces. Goats found in the plains have thinner coats suited to warmer conditions.

Reasons: These differences are adaptations. The biodiversity and features of animals vary from region to region because of distinct environmental conditions. Mountain goats need features that help them survive cold climates and rocky terrain, while plains goats need features suited to warmer, flatter habitats.

Answer: Both are goats with four legs and plant-eating habits. Mountain goats have thicker fur and gripping hooves — adaptations for cold and rocky environments. Plains goats have thinner coats suited to warmer conditions. These differences are adaptations to their different habitats.

Q5 Group the following animals into two groups based on any feature other than those discussed in the chapter — cow, cockroach, pigeon, bat, tortoise, whale, fish, grasshopper, lizard.

SOLUTION

One possible grouping is by the presence or absence of a backbone (vertebrates vs invertebrates).

Vertebrates (have backbone): Cow, Pigeon, Bat, Tortoise, Whale, Fish, Lizard.

Invertebrates (no backbone): Cockroach, Grasshopper.

Another valid grouping could be warm-blooded vs cold-blooded, or animals with wings vs animals without wings — many correct answers are possible.

Answer: Example grouping by backbone — Vertebrates: Cow, Pigeon, Bat, Tortoise, Whale, Fish, Lizard. Invertebrates: Cockroach, Grasshopper. (Other features like warm-blooded/cold-blooded or wings/no wings are also valid.)

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Q6 As the population grows and people want more comfortable lives, forests are being cut down to meet various needs. How can this affect our surroundings? How do you think we can address this challenge?

SOLUTION

Cutting forests damages the habitats of many plants and animals. When habitats are damaged, animals lose their homes, food, and other resources, which leads to loss of biodiversity.

Forests also provide clean air, prevent soil erosion, and support water cycles — all of these are harmed by deforestation.

To address this challenge: we can plant more trees, support wildlife protection projects like 'Project Tiger', reduce the use of wood, encourage the use of paper responsibly, and learn about and spread awareness on protecting biodiversity.

Answer: Cutting forests destroys habitats, causing loss of biodiversity. It also harms air quality, water cycles, and soil. We can address this by planting trees, reducing use of forest resources, and supporting conservation projects.

Q7 Analyse the flowchart. What can be examples of 'A' and 'B'?
Plant → Does it have leaves? → Yes → Does it have reticulate venation? → Yes → A; No → B

SOLUTION

In the flowchart, 'A' is reached when a plant has leaves WITH reticulate venation. Plants with reticulate venation are dicots.

Examples of A (dicot plants with reticulate venation): Hibiscus (Gudhal), Mango, Rose, Tomato, Mustard.

'B' is reached when a plant has leaves but WITHOUT reticulate venation — meaning it has parallel venation. Plants with parallel venation are monocots.

Examples of B (monocot plants with parallel venation): Grass, Wheat, Banana, Maize (corn).

Answer: A = dicot plants with reticulate venation, e.g., Hibiscus, Mango, Rose. B = monocot plants with parallel venation, e.g., Grass, Wheat, Banana.

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Q8 Raj argues with his friend Sanjay that 'Gudhal (hibiscus) plant is a shrub.' What questions can Sanjay ask for clarification?

SOLUTION

Sanjay can ask questions to check whether hibiscus matches the features of a shrub.

Possible clarifying questions:

1. How tall is the hibiscus plant — is it medium height, shorter than a tree?
2. Does the stem of the hibiscus plant branch close to the ground?
3. Is the stem hard and woody but not as thick as a tree's stem?
4. How does the hibiscus stem compare to that of a tree like mango and a herb like tomato?

These questions help verify whether hibiscus fits the description of a shrub: medium height, hard but thin woody stems branching close to the ground.

Answer: Sanjay can ask: How tall is the plant? Does it branch close to the ground? Is the stem hard but thin and woody? How does it compare to a tree and a herb? These questions check if hibiscus fits the features of a shrub.

Q9 Based on the information in the table, find out examples of these plants for each group.
Group A: Dicot, Taproot
Group B: Monocot, Fibrous roots
(a) What other similarities do plants of group A have?
(b) What other similarities do plants of group B have?

SOLUTION

Group A (Dicot, Taproot) examples: Hibiscus, Rose, Mango, Mustard, Tomato, Kidney bean, Chickpea (chana), Radish, Sadabahar (periwinkle).
Group B (Monocot, Fibrous roots) examples: Wheat, Maize (corn), Banana, Grass, Lemongrass.
(a) Other similarities of Group A plants (dicots): Their seeds have two cotyledons. Their leaves show reticulate (net-like) venation.
(b) Other similarities of Group B plants (monocots): Their seeds have a single cotyledon. Their leaves show parallel venation.

Answer: Group A examples: Hibiscus, Mango, Mustard, Chickpea. Group B examples: Wheat, Maize, Banana, Grass. (a) Group A also: two cotyledons in seeds, reticulate venation in leaves. (b) Group B also: one cotyledon in seeds, parallel venation in leaves.

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Q10 Observe the labelled part of a duck in the picture given below. What differences do you observe in the feet of the duck compared to the other birds? Which activity would the duck be able to perform using this part?
(a) Duck — Webbed feet
(b) Pigeon

SOLUTION

The duck has webbed feet — the toes are connected by a thin skin membrane, making the foot look like a paddle.
The pigeon (and most other birds) has separate, unconnected toes with claws that are suited for perching and walking.
The webbed feet of the duck act like paddles and help it swim efficiently in water. This is an adaptation for an aquatic habitat.

Answer: Duck feet are webbed (toes joined by skin membrane); pigeon feet have separate toes for perching. The duck uses its webbed feet as paddles for swimming in water.