Diversity in Plants and Animals Around Us

Introduction

The natural world is filled with an incredible variety of plants and animals, each uniquely adapted to its environment. When we study diversity in plants and animals, we explore the different characteristics that help them survive and thrive in specific habitats.

For example, in a simple garden, one can observe:

- Different types of plants, such as trees, shrubs, and herbs.
- Various animals, including birds, insects, and small mammals.

This biodiversity plays a crucial role in maintaining the balance of the ecosystem.

Curiosity as the Foundation of Science

Science begins with curiosity—the urge to explore and understand.

Simple acts like dismantling a toy or asking "why" are scientific approaches.

Diversity in Plants

Why Are Plants Different from Each Other?

Examples

- Desert plants like cactus store water in thick stems.
- Plants in rainforests have large leaves to capture sunlight.

Plants can be categorized based on height, structure, leaf venation, root system, and seed type.

Classification of Plants Based on Height

i. Herbs

Small-sized plants with soft, green, and tender stems.

Usually short-lived and lack branches.

Commonly used for food, medicine, and decoration.

Examples: Coriander, Mustard, Wheat, Paddy.

ii. Shrubs

Medium-sized plants with woody stems.

Bushy appearance, with branches close to the ground.

Commonly grown for flowers, fruits, and ornamental purposes.

Examples: Rose, Lemon, Tomato, Hibiscus.

iii. Trees

Tall plants with thick, woody trunks.

Branches grow high above the ground, forming canopies.

Provide oxygen, shade, wood, and shelter for animals.

Examples: Neem, Mango, Peepal, Banyan.

Classification of Plants Based on Stem Strength

i. Creepers

Weak-stemmed plants that spread along the ground.

Cannot stand upright; their stems spread out to support large fruits.

Examples: Pumpkin, Strawberry, Sweet Potato.

ii. Climbers

Weak-stemmed plants that grow vertically.

Use tendrils or twining stems to attach to supports like fences and walls.

Examples: Pea, Cucumber, Grapevine.

Examples of Nature's Processes

Plants: Seeds grow into plants through germination, providing oxygen and food.

Animals: Caterpillars transform into butterflies through metamorphosis.

Examples: Pea, Cucumber, Grapevine.

Classification of Plants Based on Venation

Leaf venation refers to the arrangement of veins on leaves. It is important for transporting water, nutrients, and food.

i. Reticulate Venation

Veins form a net-like pattern.

Common in dicot plants.

Examples: Rose, Mango, Peepal.

ii. Parallel Venation

Veins run parallel to each other along the leaf.

Common in monocot plants.

Examples: Banana, Grass, Wheat.

Classification of Plants Based on Root System

i. Taproot System

One thick main root grows deep into the soil.

Smaller roots branch out from the main root.

Common in dicot plants.

Examples: Carrot, China Rose, Mango.

ii. Fibrous Root System

Cluster of thin, thread-like roots of similar size.

Spread out just below the soil surface.

Common in monocot plants.

Examples: Grass, Wheat, Sugarcane.

Key Differences:

- Taproots provide strong anchorage and access deep water.
- Fibrous roots help in quick water absorption and prevent soil erosion.

Classification of Plants Based on Seeds

i. Monocotyledons (Monocots)

Seeds contain one cotyledon (seed leaf).

Have parallel venation and a fibrous root system.

Examples: Maize, Rice, Bamboo.

ii. Dicotyledons (Dicots)

Seeds contain two cotyledons (seed leaves).

Have reticulate venation and a taproot system.

Examples: Pea, Mango, Sunflower.

This classification helps in understanding how different plants grow and adapt to their surroundings.

Diversity in Animals

Why Do Animals Look and Behave Differently?

Animals vary in size, shape, movement, and behavior based on their environment.

- Some animals fly (birds, insects), while others swim (fish, whales).
- Animals in cold regions have thick fur to stay warm, while desert animals store water.

Habitats of Animals

i. Terrestrial Animals (Land Animals)

Live in forests, deserts, mountains, and grasslands.

Examples: Lions, Elephants, Snakes.

ii. Aquatic Animals (Water Animals)

Live in rivers, lakes, and oceans.

Examples: Fish, Whales, Dolphins.

iii. Aerial Animals (Flying Animals)

Spend most of their time in the air.

Examples: Birds, Houseflies, Bees.

Classification of Animals Based on Diet

i. Herbivores (Plant-Eaters)

Eat plants, grass, leaves, and fruits.

Examples: Deer, Cows, Rabbits.

ii. Carnivores (Meat-Eaters)

Eat other animals.

Examples: Lions, Tigers, Eagles.

iii. Omnivores (Plant + Meat Eaters)

Eat both plants and animals.

Examples: Humans, Bears, Crows.

Understanding animal diets helps in knowing their role in nature.

Classification of Animals Based on Movement

Walking: Goats, Cows, Humans.

Jumping: Frogs, Kangaroos.

Flying: Birds, Bees.

Swimming: Fish, Whales.

Crawling: Snakes, Caterpillars.

Climbing: Monkeys, Squirrels.

These adaptations allow animals to survive in different environments.

Why is Biodiversity Important?

Maintains ecological balance by supporting food chains.

Provides oxygen, food, and medicine.

Helps in soil formation and climate regulation.

Famous Scientist: Janaki Ammal

Dr. Janaki Ammal (1897–1984) was an Indian botanist known for her work in plant diversity and conservation.

- Contributed to India's biodiversity research.
- Led the Save Silent Valley movement to protect forests.
- Served as the Director of the Botanical Survey of India.

Her contributions helped protect India's rich plant life.