# Chapter 7 - Diversity in Living Organisms

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**Question 1:**
Why do we classify organisms?

**Answer 1:**
There are millions of species on this earth. For anybody, it is impossible to study about each of them in his lifetime. Classification makes it easy to study the organisms; on the basis of certain common characters.

**Question 2:**
Give three examples of the range of variations that you see in life forms around you.

**Answer 2:**
Three examples of the range of variations in life forms:

- Ants, cockroaches, spiders, houseflies, etc. live in the same building. They look entirely different from each other yet all of them belong to **arthropoda.**

- Humans, monkeys, cats and dogs lives in the same neighbourhood. They look entirely different yet all of them belong to **mammalia.**

- A nearby park may show wide variety of plants; right from small grass to a giant banyan tree.

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**Question 1:**
Which do you think is a more basic characteristic for classifying organisms?
(a) the place where they live.
(b) the kind of cells they are made of. Why?

**Answer 1:**
The kind of cells an organism is made of is more basic characteristic of classifying organism because it gives a scientific angle to classification. Moreover, a particular dwelling place can be full of organisms of a wide variety.

**Question 2:**
What is the primary characteristic on which the first division of organisms is made?

**Answer 2:**
Organisation of nucleus is the primary characteristic on which the first division of organisms is made. Based on this, organisms can be either prokaryotic or eukaryotic.

**Question 3:**
On what bases are plants and animals put into different categories?

**Answer 3:**
Plants are autotrophs, while animals are heterotrophs. Cell wall is present in plant cells, while it is absent in animal cells. Plants do not need to move from one place to another, while most of the animals need to move in search of food.

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**Question 1:**
Which organisms are called primitive and how are they different from the so-called advanced organisms?

**Answer 1:**
An organism which is simple is called primitive. On the other hand, an organism with high level of division of labour, by formation of organs and organ system is called advanced.

**Question 2:**
Will advanced organisms be the same as complex organisms? Why?

**Answer 2:**
Complexity in body design evolves because of necessity to adapt according to the changing environment. Hence, a complex organism would be an advanced one; in comparison to a simple organism.

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**Question 1:**
What is the criterion for classification of organisms as belonging to kingdom Monera or Protista?

**Answer 1:**
Organisms which are prokaryotes belong to the kingdom Monera. On the other hand, organisms which are eukaryotes and unicellular belong to the kingdom Protista.

**Question 2:**
In which kingdom will you place an organism which is single-celled, eukaryotic and photosynthetic?

**Answer 2:**
Plant Kingdom

**Question 3:**
In the hierarchy of classification, which grouping will have the smallest number of organisms with a maximum of characteristics in common and which will have the largest number of organisms?

**Answer 3:**
Species will have the smallest number of organisms with a maximum of characteristics in common. On the contrary, kingdom will have the largest number of organisms.

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**Question 1:**
Which division among plants has the simplest organisms?

**Answer 1:**
Thallophyta

**Question 2:**
How are pteridophytes different from the phanerogams?

**Answer 2:**
In pteridophytes, the reproductive organs are hidden and they do not produce seeds.
In phaenrogams, the reproductive organs are conspicuous and they produce seeds.

**Question 3:**
How do gymnosperms and angiosperms differ from each other?

**Answer 3:**
Seeds are naked in gymnosperms, while they are covered in angiosperms. Gymnosperms do not bear flowers, while angiosperms bear flowers.

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**Question 1:**
How do poriferan animals differ from coelenterate animals?

**Answer 1:**
In porifera, body has numerous pores, which are absent in coelenterates. Body has a cavity in coelenterates, while it is absent in porifera.

**Question 2:**
How do annelid animals differ from arthropods?

**Answer 2:**
Segmented body in annelids, while true segmentation is absent in arthropods. Arthropods have joined appendages, which are absent in annelids.

**Question 3:**
What are the differences between amphibians and reptiles?

**Answer 3:**
- Amphibians need water to lay eggs and fertilization is external. Reptilians do not need water to lay eggs and fertilization is internal.
- Amphibians use both skin and lungs for breathing. Reptilians breathe through lungs only.

**Question 4:**
What are the differences between animals belonging to the Aves group and those in the mammalian group?

**Answer 4:**
- In aves, body is covered with feathers; while in mammals, body is covered with hairs.
- Mammary glands are absent in aves while present in mammals.
- Forelimbs of aves are modified into wings which is not the case in mammals.
- Aves are oviparous, while most of the mammals are viviparous.

## Exercises

**Question 1:**
What are the advantages of classifying organisms?

**Answer 1:**
There are millions of species on this earth. For anybody, it is impossible to study about each of them in his lifetime. Classification makes it easy to study the organisms; on the basis of certain common characters.

**Question 2:**
How would you choose between two characteristics to be used for developing a hierarchy in classification?

**Answer 2:**
We need to look at the fact if given character is present in a small number of organisms or a larger number of organisms. In the first case, the commonality of characters would represent a species. In the latter case, the commonality of characters would represent a higher taxa; like genus, family, order or phylum.

**Question 3:**
Explain the basis for grouping organisms into five kingdoms.

**Answer 3:**
Following points explain the basis of grouping organisms into five kingdoms. Organization of nucleus: Organisms with unorganized nucleus are kept under the kingdom Monera. Those with organized nucleus are kept in other kingdoms.

**Number of cells:**
Unicellular eukaryotes are kept in the kingdom Protista, while multicellular eukaryotes are kept in other kingdoms.
**Mode of nutrition and presence of cell wall:**
Hetereotrophic organisms in which cell wall is present are taken under the kingdom fungi. Autotrophic organisms in which cell wall is present are taken in the kingdom Plantae. Organisms in which cell wall is absent are taken in the kingdom Animalia.

**Question 4:**
What are the major divisions in the Plantae? What is the basis for these divisions?

**Answer 4:**
The major divisions of Plantae and the basis for these divisions are as follows:

- **Thallophyta:** Simple body design; with no differentiation into root, stem and leaves.
- **Bryophyta:** Body is differentiated into stem and leaf-like structures. Vascular system is absent.
- **Pteridophyta:** Body is differentiated into root, stem and leaves. Vascular system is present.

Reproductive organs are inconspicuous. Seeds are not produced.

- **Gymnosperms:** Seeds are naked.
- **Angiosperms:** Seeds are covered.

**Question 5:**
How are the criteria for deciding divisions in plants different from the criteria for deciding the subgroups among animals?

**Answer 5:**
In the plant kingdom, morphological characters are taken into consideration while deciding about the divisions. Morphology is the study of shapes and forms of various parts. In the animal kingdom, anatomical characters are taken into consideration while deciding about subgroups. Anatomy is the study of various organs' design in animals.

**Question 6:**
Explain how animals in Vertebrata are classified into further subgroups.

**Answer 6:**
Vertebrates are classified into further subgroups on following bases:

**1. Pisces:** The body is streamlined. Muscular tail is present which assists in locomotion. Body is covered with scales. Paired gills are present; which can breathe oxygen dissolved in water. They are cold-blooded animals. The heart has only two chambers. They lay eggs.

**2. Tetrapoda:** Animals have four limbs for locomotion and hence the name tetrapoda. Tetrapoda is divided into four classes, viz. amphibia, reptilia, aves and mammalia.

(a) **Amphibia:** These animals are adapted to live both in water and land. Mucus glands on skin keep the skin moist. The animals breathe through skin when in water and through lungs when on land. The heart has three chambers. These are cold blooded animals. Examples: Frog, toad, salamander, etc.

(b) **Reptilia:** These animals show crawling movement for locomotion. Skin is hardened to form scales. Most of the reptilians have three chambered heart but crocodile has four-chambered heart. They don't need water to lay eggs, rather eggs are covered with hard shells and laid on land. Examples: snakes, lizards, crocodile, turtle, etc.

(c) **Aves:** The body is covered with feathers. Forelimbs are modified into wings. These are warm-blooded animals. The heart has four chambers. Bones are hollow (pneumatic); which assists in flying. All the birds belong to this class.

(d) **Mammalia:** The body is covered with hairs. Skin has seat glands and sebaceous glands. Mammary glands are present in females and are used for nourishing the young ones. Most of the mammalians give birth to young ones and are called viviparous. Some of the mammals lay eggs and are called oviparous. Examples: human, chimpanzee, lion, platypus, horse, etc.