Chapter – 7 Diversity in Living Organisms

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Q1. Why do we classify organisms?

Answer: Classification of organisms helps to study their characteristics easily. It also helps to classify different things into a class and to study the group.

Q2. Give three examples of the range of variations that you see in life forms around you?

Answer: The life span of different animals are: Turtles live for hundreds of years, but mosquitoes die in a few days. Life ranges from colourless to colourful worms.

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Q1. 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 (a) No, not the place where they live.

(b) Yes, the kind of cells they are made of because different organisms live in same habitat with different form and structure. So, basis of classification cannot be the place where they live.

Q2. What is the primary characteristic on which the broad division of organisms is made?

Answer The primary characteristic on which the broad division of organisms is made is the nature of cell, to classify organism as prokaryotic or eukaryotic organism.

Q3. On what basis are plants and animals put into different categories?

Plants and animals are put in different categories on the basis of following characteristics:

a) CELL COMPOSITION: Plant cells have cell wall and animal cells have no cell wall.

b) MODE OF NUTRITION: Plants are autotrophic and prepare their own food by photosynthesis but animals are heterotrophic as they depend on others to prepare food.

c) LOCOMOTION: Plants do not have locomotory organs so are immobile and animals have locomotory organs.

d) CHLOROPLASTS: Plants have chloroplast but animals do not have.

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Q1. Which organisms are called primitive and how are they different from the so-called advanced organisms?

Answer Primitive organisms have simpler body structure so are known as lower organisms. The organisms that have more complex body structure so are known as higher or advanced organisms.

Q2. Will advanced organisms be the same as complex organisms. Why?

Answer Yes, advanced or higher organisms are same as complex organisms because they were primitive organisms and have advanced with evolution, as complexity increases with evolution.

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Q1. What is the criterion for classification of organisms as belonging to kingdom Monera or Protista?

Answer The organisms of Kingdom Monera are unicellular and prokaryotic and the organisms of Kingdom Protista are unicellular and eukaryotic.

Q2. In which kingdom will you place an organism which is single celled, eukaryotic and photosynthetic?

Answer A eukaryotic organism is single-celled, photosynthetic which is placed in the kingdom Protista.

Q3. In the hierarchy of classification, which grouping will have the smallest number of organisms with maximum common characteristics and which will have the largest number of organisms?

Answer In the hierarchy of classification, **species** will have the smallest number of organisms with a maximum common characteristic, whereas the **kingdom** will have the largest number of organisms.

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Q1. Which division among plants has the simplest organisms?

Answer The division Thallophyte has the simplest organisms as their body structure is simple and do not possess a body-specific design. For examples: bacteria, algae, fungi, lichens.

Q2. How are pteridophytes different from the phanerogams?

Answer: Pteridophytes have naked embryos called spores. Phanerogams produce seeds which has embryo and stored food.

Q3. How do gymnosperms and angiosperms differ from each other?

Answer Angiosperms are flowering plants with their seeds in the fruits. Gymnosperm do not bear flower and fruits and their seeds are visible on the surface of leaves or scales.

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Q1. How do poriferan animals differ from coelenterate animals?

Answer Poriferan are marine, non-motile and found on rocks. They either live in colonies or have a lonely life span. Examples - Hydra, Sea Anemone, Corals etc.

Q2. How do annelid animals differ from arthropods?

Answer: Annelids have closed circulatory system whereas Arthropods have an open circulatory system. Arthropods have jointed appendages but it is absent in Annelids.

Q3. What are the differences between amphibians and reptiles?

Answer Reptiles are snakes, turtles and lizards, which have a backbone. They lay hard-shelled eggs, but a few give births to live young. All reptiles have scales and are cold-blooded that is their own body temperature fluctuates while amphibians are toads, frogs and salamanders.

Frogs are amphibians which live on land, but in their larval stage, as tadpoles, they live in water. Amphibians lay eggs in the water, and their young have gills to survive in the water. Amphibians eggs are covered with gel whereas Reptiles eggs are covered with a hard protective covering**.**

Q4. What are the differences between animals belonging to the Aves group and those in the Mammalia group?

Answer. Aves have their body covered in feathers as their forelimbs are modified into wings. Birds are warm-blooded animals. They have well-developed flight muscles and their hind limbs are modified for walking, hopping, perching, grasping, wading and swimming. For example: birds.

Mammals have mammary glands and body is covered with fur, sweat glands, a four-chambered heart and glands to produce milk, known as mammary glands.

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Q1. What are the advantages of classifying organisms?

Answer:

The advantages of classifying organisms are:

1. Classification of organisms facilitates their identification and makes their study useful.
2. There are a large number of organisms present in the world, this is not possible by an individual to know about all individuals.
3. It gives information about the organisms which do not occur in a one particular locality.
4. It tells development of evolution by showing increase complexity of structure in various groups of organisms.

Q2. How would you choose between two characteristics to be used for developing a hierarchy in classification?

Answer:

a) We should decide which characteristic is to be used as the basis to make the division, before developing a hierarchy in classification.

b) Then, we collect the next set of characteristics for making sub-group.

c) This process must continue and each time new characteristic should be used.

d) Those characteristics which agree with the broad division in living organism should be independent of any other characteristics. For example, nature of cell and form of the body is used to classify organisms into broad division like Prokaryotes and Eukaryotes.

e) The next level characteristics depend on the previous one that will decide the successive division of the groups.

Q3. Explain the basis for grouping into five kingdoms.

Answer:

The Whittaker (1959) have classified living organisms into five kingdoms such as Monera, Protista, Fungi, Plantae and Animalia on the following four basis:

1. Complexity of cell structure.

   - The cell structure is divided into Prokaryotic and Eukaryotic. So these two form two groups in which one is having a cell wall and other one is not having cell wall.

2. Unicellular and multicellular organisms.

   - This specific characteristic makes a basic difference in the body structure of living organisms and helps in their classifications.

3. Mode of nutrition.

   - There are two types of nutrition – autotrophic, which prepare their own food and other is heterotrophic, which obtain their food from other organisms.

4. Phylogenetic relationship.

   - Phylogeny is the ancestry of an organism. The simple organisms are primitive and complex organisms are progressive. So, primitive and progressive nature of organisms helps in their classification.

Q4. What are the major division in the Plantae? What is the basis of this division?

Answer:

The Plantae kingdom is divided into five divisions:

1. Thallophyta (Algae).

2. Bryophyta.
3. Pteridophyta.
4. Gymnospermae.
5. Angiospermae.

a) First division of classification is based on the presence and absence of well – defined components in the body. Algae are separated from other plants in having simple and less defined plant body.
b) Second division of classification is based on the presence of and absence of vascular tissues like xylem and phloem which separates the Bryophyta from the rest of the plants.
c) Third division of classification is based on the ability to bear seeds. Pteridophytes do not bear seeds.
d) Fourth division of classification is based on plants with naked seeds and bear no flowers and fruits (The gymnosperms)
e) Fifth division of classification is based on plants with seeds and bear flowers and fruits (The Angiosperm) .

Q5. How are the criteria for deciding in plants different from the criteria for deciding the sub-groups among animals?

Answer:

The basic structure plant and animal bodies are different so, the criteria for divisions in plants are also different from the sub-groups in animals.

Plants are autotrophic and cannot move, but animals are heterotrophic and they can move. So, the body structure of two groups is based on the need to prepare their own food in plants and to collect from different source for animals.

Other characteristics like presence or absence of skeleton are also used to make sub-groups among animals.

Q6. Explain how animals in Vertebrata are classified into further sub-groups?

Answer:

The main characteristics to classify animals in Vertebrata are:

1. The type of exoskeleton or endoskeleton.
2. The type of respiratory organs.
3. The type of reproduction.

On the basis of above characters, the division of vertebrata are:

1. Exoskeleton of scales and Endoskeleton of cartilage or bones, breathing through gills – fishes.
2. Breathing through gills in larva, skin oily – Amphibia.
3. Exoskeleton of scales , laying eggs outside the water – Reptilia.
4. Exoskeleton of feathers, lays eggs, flight possible – Aves.
5. Exoskeleton of hair, external ears, giving birth to young – Mammalia.