

NCERT solutions for class 9 science chapter 7 Diversity in Living Organisms

Q 1. Why do we classify organisms?

Answer:

It is necessary to classify organisms because:

- Classification allows us to understand diversity better.
- It helps in the identification of living organisms as well as in understanding the diversity of living organisms.
- Classification helps us to learn about different kinds of plants and animals, their features, similarities, and differences.
- It enables us to understand how complex organisms evolve from simpler organisms.
- To understand and study the features, similarities, and differences between different living organisms, they are grouped under different categories.
- A classification is a tool that helps us to deal with a great diversity of living forms.
- It is essential to understand the inter-relationships among the different groups of organisms.
- Classification forms a base for the development of other biological sciences.

Q 2. Give three examples of the range of variations that you see in lifeforms around you.

Answer:

The three examples of the range of variations in the life forms are:

(i) Variation in size: for example, the size of the bacteria are so small that they cannot be seen without observing under the microscope. Elephants, whales are so big mammals living species.

(ii) Variation in the colours: Some living creatures are colourless, such as worms, whereas creatures like insects, flowers, birds have beautiful colours on their body.

(iii) Variations in the lifespan: The insects usually have a very short life span of about a few hours while there are some life forms which do have a large lifespan for example Tortoise, shark, etc.

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Topic 7.1 What is the basis of classification

Q 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:

The basic characteristic for all living organisms is (b) the kind of cells they are made up of because:

A eukaryotic cell has membrane-bound organelles, including a nucleus, which allows cellular processes to be carried out efficiently in isolation from each other. Organisms that do not have a nucleus would need to have their biochemical pathways organized in very different ways. This would have an effect on the cell design. Further, nucleated

cells would have the capacity to participate in making a multicellular organism because they can take up specialized functions.

Therefore, the nucleus can be a basic characteristic of classification.

Q 2. 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 based on whether the cells are single-celled or unicellular or they are grouped together and function as an individual group known as Multicellular.

Q 3. On what bases are plants and animals put into different categories?

Answer:

Plants produce their own food through the process of photosynthesis while animals have to get food from outside, hence both have different body designs.

Therefore, they are put into different categories.

NCERT solutions for class 9 science chapter 7 Diversity in Living Organisms

Topic 7.2 Classification and Evaluation

Q 1. Which organisms are called primitive and how are they different from the so-called advanced organisms?

Answer:

The organisms which have ancient body designs and that have not changed much are called **primitive organisms** or lower organism and are simple life forms.

While the organisms that have acquired their particular body designs relatively recently, they are called **advanced organisms** or higher organisms. They have more complex life forms.

Q 2. Will advanced organisms be the same as complex organisms? Why?

Answer:

Yes, Since there is a possibility that complexity in design will increase over evolutionary time, it may not be wrong to say that older organisms are simpler, while younger organisms are more complex.

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Topic 7.3 The Hierarchy of classification groups

Q 1. What is the criterion for the classification of organisms as belonging to the kingdom Monera or Protista?

Answer:

The criterion for the classification of organisms as belonging to kingdom-Monera and Protista are:

For the Kingdom Monera:

(i) These organisms do not have a defined nucleus or organelles, nor do any of them show multi-cellular body designs.

(ii) Some of them have cell walls while some do not.

(iii) The mode of nutrition of organisms in this group can be either by autotrophic method or heterotrophic method.

(iv) The organisms belonging to Monera are bacteria, blue-green algae, and mycoplasma.

For the Kingdom Protista:

(i) These are unicellular eukaryotic organisms.

(ii) Both types of nutrition are possible i.e., autotrophic or heterotrophic.

(iii) These organisms have hair-like cilia or whip-like flagella for moving around.

(iv) The organisms belonging to Protista are, algae, protozoans.

Q 2. In which kingdom will you place an organism which is single-celled, eukaryotic and photosynthetic?

Answer:

The organism which is single-celled, eukaryotic and photosynthetic is in Kingdom - **Protista**.

Q 3. 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:

Species are the grouping that will have the smallest number of organisms with a maximum of characteristics in common.

Kingdom will have the largest number of organisms with a maximum characteristic common.

NCERT textbook solutions for class 9 science chapter 7 Diversity in Living Organisms

Topic 7.4 Plantae

Q 1. Which division among plants has the simplest organisms?

Answer:

The division '**Thallophyta**' of the plant kingdom has the simplest organisms also these organisms do not have well-differentiated body design.

Q 2. How are pteridophytes different from the phanerogams?

Answer:

Pteridophytes are different from the phanerogams in the following ways:

S.No.	Pteridophytes	Phanerogams
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1.	They have hidden reproductive organs. So are called as cryptogams	They have well-differentiated reproductive tissues.
2.	They do not produce seeds.	They produce seeds.
3.	Includes ferns, Marsilea.	Includes gymnosperms and angiosperms.

Q 3. How do gymnosperms and angiosperms differ from each other?

Answer:

The differences between Gymnosperms and Angiosperms.

S.No.	Gymnosperms	Angiosperms
1.	The plant of this group bear naked seeds	The seeds are covered inside an ovary which is modified to become a fruit.
2.	They are usually perennial, evergreen and woody.	Plants may be annual, biennial, perennial, woody or non-woody.

3.	The plant embryo contains many cotyledons.	Cotyledons are present only one or two.
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Solutions for NCERT class 9 science chapter 7 Diversity in Living Organisms

Topic 7.5 Animalia

Q 1. How do poriferan animals differ from coelenterate animals?

Answer:

The differences between poriferan and coelenterate animals are:

S.No.	Poriferan	Coelenterate
1.	These organisms have holes(pores) over their bodies.	With a single opening, these organisms have a body with a cavity called coelenteron.

2.	The body design involves very minimal differentiation and division into tissues.	They show more body design differentiation.
3.	Made up of a single layer of cells.	The body is made up of two layers of cells.
4.	They are non-motile and attached to some solid support.	Some live in colonies (corals) while some have a solitary like - span (Hydra).
5.	They have a characteristic canal system to help to circulate water through the body to bring in food and oxygen.	They have a cavity in their bodies.

Q 2. How do annelid animals differ from arthropods?

Answer:

Annelids v/s Arthropods :

The circulatory system of annelids is closed. while Arthropods have an open circulatory system.

The body is divided into several identical segments. while the body is divided into a few specialized segments.

Appendages are absent in Annelids. while Arthropods have joined appendages.

Q 3. What are the differences between amphibians and reptiles?

Answer:

Amphibians and reptiles are both classes of living things that are cold-blooded and have backbones.

Amphibians begin life in water and later mature on land. They are cold-blooded vertebrates, consisting mainly of frogs, toads, and salamanders. Amphibians begin life breathing water through gills, and grow to breathe air through lungs. They are found living in the wild worldwide, especially in tropical areas. The term "amphibious" can also be applied to a vehicle that functions on land or air as well as in water.

Reptiles are cold-blooded, have a backbone, lay eggs, are covered in scales, and breathe air through lungs. They generally have short legs and long tails. Because they are cold-blooded, they usually live in warm climates or hibernate during winter months. Some of the earliest-known reptiles were dinosaurs. Modern reptiles include crocodiles, snakes, lizards, and turtles.

The primary distinguishing feature between amphibians and reptiles is the ability of an amphibian to sustain life underwater for at least part of its life. Amphibians are smoother

and moister than reptiles, which are dry and scaly, and need to live close to a water source.

Q 4. What are the differences between animals belonging to the Aves group and those in the Mammalia group?

Answer:

In Aves, forelimbs are modified into wings for flight. In mammals, the forelimbs are variously adapted for walking, running, climbing, swimming, etc.

Aves have pneumatic bones which are absent in mammals.

Birds excrete uric acid whereas mammals excrete urea.

Mammals show mammary glands which are absent in aves.

Aves are oviparous whereas mammals are viviparous.

NCERT Solutions for Class 9 Science Chapter 7 Diversity in Living Organisms: Solved Exercise Questions

Q 1. What are the advantages of classifying organisms?

Answer:

The advantages of classifying organisms are as follows:

- (i) Classification facilitates the identification of organisms.
- (ii) helps to establish the relationship among various groups of organisms.

(iii) helps to study the phylogeny and evolutionary history of organisms.

(iv) By studying a few animals, the characteristics of the whole group can be known.

Q 2. How would you choose between two characteristics to be used for developing a hierarchy in classification?

Answer:

For developing a hierarchy of classification, we choose the fundamental characteristics among several other characteristics. We need to look at the fact if the given character is present in a small number of the organism.

By choosing the basic characteristic, we can make broad divisions in a living organism as the next level of character is dependent on these. This goes on to form a hierarchy of characteristics.

Q 3. Explain the basis for grouping organisms into five kingdoms.

Answer:

The basis for grouping organisms into five kingdoms are,

(i) Whether the organisms are made of prokaryotic or eukaryotic cells.

(ii) Whether the organism is unicellular, i.e, a cell living singly or organized into multicellular and thus complex organisms.

(iii) Whether the cells have a cell wall.

(iv) Whether they prepare their own food or get their food from outside.

Q 4. What are the major divisions in the Plantae? What is the basis for these divisions?

Answer:

The major divisions in kingdom Plantae are Thallophyta, Bryophyta, Pteridophyta, Gymnosperms, and Angiosperms.

The following points constitute the basis of these divisions:

- (i) Presence or absence of distinct organdles.
- (ii) Presence or absence of distinct and differentiated tissues, which can carry food and water.
- (iii) Presence or absence of seeds.
- (iv) Whether the seeds are enclosed within fruits or not.

Q 5. How are the criteria for deciding divisions in plants different from the criteria for deciding the subgroups among animals?

Answer:

Criteria for dividing the plant include.

- 1- differentiation of the plant body.
- 2- distinct vascular tissues.
- 3- seed producing ability.
- 4- the seeds enclosed within fruits.

but the animals cannot be divided into a group on these criteria. it is because the basic designs of animals are very different from plants. they are divided on the basis of their body structure.

Q 6. Explain how animals in Vertebrata are classified into further subgroups.

Answer:

Vertebrates are further classified according to several criteria like an exoskeleton, respiratory organs, method of giving birth, number of chambers in heart, mode of living, etc. They are further classified into classes Pisces, Amphibia, Reptilia, Aves and Mammals.

Pisces include the fishes. They are aquatic, cold-blooded animals having 2 chambers of the heart. Their skin is covered with scales/plates. They lay eggs and respire through gills. They excrete urea. Endoskeleton may be bony or cartilaginous.

Amphibians, on the other hand, live partly in water and partly on land. Their skin is smooth without scales. Respiration is through gills, lungs, skin or buccal lining. They possess 3 chambered heart and are oviparous. They are cold-blooded.

Reptiles are the creeping vertebrates possessing dry scaly exoskeleton. They are cold-blooded, breathe through lungs and possess 3 chambered heart. They are oviparous and excrete uric acid.

Aves include the birds. They are warm-blooded, oviparous vertebrates with a covering of feathers. Their fore-limbs are modified into wings for flight. Respiration is through lungs and 4 chambered heart is present.

Mammals possess mammary glands for feeding the young. They are warm-blooded with 4 chambered heart. They are viviparous. They possess external pinna and hair on the skin. Parental care is highly developed. They excrete urea.