NCERT Solution for Class 9 Science - Chapter 7 Diversity In Living Organisms

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1. Why do we classify organisms?

Solution:

By classifying organisms, it is easier and more convenient to study their characteristics. Similarities exhibited by various entities allow us to categorize different entities into a class and hence study the group as a whole.

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

Solution:

Listed below are a few ranges of variations observed in life-forms:

(a) Small frog to big whale

(b) Creeper to the eucalyptus tree

(c) Black cuckoo to colourful peacock.

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3. 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?

Solution:

The most basic classification of organisms should be established on the kind of cells they are made up. This is because the habitat can have species with different characteristics living harmoniously whereas the entities with similar cell arrangement will exhibit equivalent characteristics.

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

Solution:

The basic characteristic on which organisms are primarily divided is the nature of cells. It is broadly classified as prokaryotic cells and eukaryotic cells which furthermore is classified into subclasses.

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

Solution:

The following is the basis for categorization of plants and animals:

(a) The most fundamental consideration of classification is the presence and absence of a cell wall.

(b) The next important criterion is the mode of nutrition. The mechanism through which entities acquire their nutrients is used as the base for classification.

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

Solution:

Primitive organisms are the organisms that exhibit a very simple and basic cell arrangement, mechanism and structure and no division of labour is observed. Advanced organisms, on the other hand, are the organisms possessing millions of cells that are grouped into various organs performing different functionality such as mammals.

7. **Will advanced organisms be the same as complex organisms? Why?**
Solution:

Yes. Complex organisms are the same as advanced organisms. The consequence of advancement leads to multiple cell arrangements that operate uniquely.

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8. **What is the criterion for classification of organisms as belonging to kingdom Monera or Protista?**
Solution:

One of the most significant differences in classification is the development of the nucleus. The ones with no nuclear membrane are defined to be Monera while the ones that have well-defined nuclei walls are Protista.

9. **In which kingdom will you place an organism which is single-celled, eukaryotic and photosynthetic?**
Solution:

Since the cell is photosynthetic, it must have a well-defined nucleus wall. Therefore it needs to be placed in Protista kingdom.

10. **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?**
Solution:

(a) The organisms belonging to the Kingdom Monera will have the smallest number of organisms and with maximum characteristics in common.
(b) The organisms belonging to the Kingdom Animalia will have the largest number of organisms.

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11. **Which division among plants has the simplest organisms?**
Solution:

Algae or Thallophyta has the simplest organisms among the plants.

12. **How are pteridophytes different from the phanerogams?**

Solution:

The following are the differences:

Pteridophytes	Phanerogams
They possess a naked embryo	They possess a covered embryo
Exhibit unclear reproductive organ	Exhibit well-defined reproductive organ

13. **How do gymnosperms and angiosperms differ from each other?**
Solution:

In gymnosperms, the seeds are naked while in angiosperms the seeds are covered.

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14. **How do poriferan animals differ from coelenterate animals?**
Solution:

Listed below are the differences:

Porifera	Coelenterata
Division of labour is not noticed	Division of labour is observed
Cellular level of organization exhibited	Tissue level of organization exhibited
Coelom absent	Coelom present

15. How do annelid animals differ from arthropods?
   Solution:

Listed below are the differences:

Annelida	Arthropoda
The entire body is segmented into rings	Segmentation of body into head, abdomen and the thorax region
Skeleton is absent	Presence of exoskeleton
Hermaphrodites	Presence of different sexes, bisexual present

16. What are the differences between amphibians and reptiles?
   Solution:

Listed below are the differences:

Amphibia	Reptilia
Skin is moist and soft	Skin is hardened
In water, they breathe through their skin	Can exist in water. They come to land to intake oxygen
Respire through lungs or gills	Respire through lungs
Capable of jumping	They crawl
Indirect development is noticed	Direct development observed

17. What are the differences between animals belonging to the Aves group and those in the mammalian group?

Solution:

Listed below are the differences:

Aves	Mammalia
Body is covered with feathers	Body is covered with hairs
Teeth absent	Teeth present
They possess a beak	Beak absent
Forelimbs are present and modified to take a flight	Forelimbs are present and used for multiple activities
Bones are hollow	Bones are solid
Body is streamlined	Streamlining of body is not observed(except whales)

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1. **What are the advantages of classifying organisms?**
    Solution:

    Listed below are the advantages of classification of organisms:
    *   When organisms are classified, their common features can easily be studied.
    *   The study of scientific experiments is simplified.
    *   The interrelation of humans with other entities can be interpreted. Their dependence and interactions can be studied.
    *   When entities are crossbred and modified genetically, it paves the way for commercial applications.

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

    The basis of the start of the hierarchy will be formed by the Gross character while the basis of steps further will be taken care of by the fine character.
    For instance:
    *   Human beings are categorized under vertebrates as they possess the vertebral column
    *   For categorization of tetrapods,

- For Tetrapods, the existence of four limbs is taken into consideration.
- In the case of mammals, the mammary gland is the required part.

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

   The following factors govern the basis of grouping organisms into five kingdoms,
   - The number of cells present forms the first criteria.
   - Next is the arrangement and the number of layers present.
   - Another important factor for classification is the existence of cell wall
   - Classification of complex organisms is also based on the mode of intake of nutrition
   - To classify, we consider the organization level too.

4. **What are the major divisions in the Plantae? What is the basis of these divisions?**
   Solution:

   The following table depicts plant division and the basis of classification for each division.

Division	Basis of Classification
Thallophyta or Algae	Like body
Bryophyta	The body is divided into leaf and stem
Pteridophyta	The body is separated into root, stem and leaf
Gymnosperm	Seed-bearing, naked seeds
Angiosperm	Seed bearings covered seeds

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

   - One of the major specifications to categorize plants into Thallophytes and Bryophytes is the basic cell structure.
   - Gymnosperms and Angiosperms are classified on the basis of visibility of seeds.
   Hence, morphological characteristics play a key role in plant classification. In animal classification, cytology is considered primarily as more minute structural variations are taken into account.
   - The cell layers, cytology, morphology are significant features to be considered in the classification of animals.

- The presence and absence of various features decide the classification of higher hierarchies.

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

   Vertebrata has two subclasses namely
   - Pisces
   - Tetrapod

   Wherein, organisms belonging to Pisces subclass have a streamlined body with tails and fins which help them in their movement (swim) whereas, the Tetrapoda species have four limbs for their movement.

   Furthermore, The tetrapod animals are classified as:

   1. Amphibia: The animals belonging to this group are adaptive in nature. They dwell both in the land as well as in water. They show the presence of specialized organs which allows them to breathe underwater.

   2. Reptilia: The animals belonging to this class crawl. Their skin is very thick and withstands extreme temperatures.

   3. Aves: The forelimbs of these organisms are modified which help them in their flight. They lack teeth and instead have a beak and feathers that cover up their body.

   4. Mammalia: The animals belonging to this group show nurturing skills as they contain mammary glands to support them. Their skin is covered with hair and most of them are viviparous in nature.