



SpeedLabs
Science

CBSE 9th

TEEVRA EDUTECH PVT. LTD.

Diversity in Living Organisms

Exercise

1. What are the advantages of classifying organisms?

Ans. There are a wide range of life forms (about 10 million-13 million species) around us. These life forms have existed and evolved on the Earth over millions of years ago. The huge range of these life forms makes it very difficult to study them one by one. Therefore, we look for similarities among them and classify them into different classes so that we can study these different classes as a whole. This makes our study easier.

Therefore, classification serves the following advantages.

- (i) It determines the methods of organising the diversity of life on Earth.
- (ii) It helps in understanding millions of life forms in detail.
- (iii) It also helps in predicting the line of evolution.

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

Ans. For developing a hierarchy of classification, we choose the fundamental characteristic among several other characteristics. For example, plants differ from animals in the absence of locomotion, chloroplasts, cell wall, etc. But, only locomotion is considered as the basic or fundamental feature that is used to distinguish between plants and animals. This is because the absence of locomotion in plants gave rise to many structural changes such as the presence of a cell wall for protection, and the presence of chloroplast for photosynthesis (as they cannot move around in search of food like animals). Thus, all these features are a result of locomotion. Therefore, locomotion is considered to be a fundamental characteristic. By choosing the basic or fundamental characteristic, we can make broad divisions in living organisms as the next level of characteristic is dependent on these. This goes on to form a hierarchy of characteristics.

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

Ans. R.H. Whittaker proposed a five kingdom classification of living organisms on the basis of Linnaeus' system of classification. The five kingdoms proposed by Whittaker are Monera, Protista, Fungi, Plantae, and Animalia.

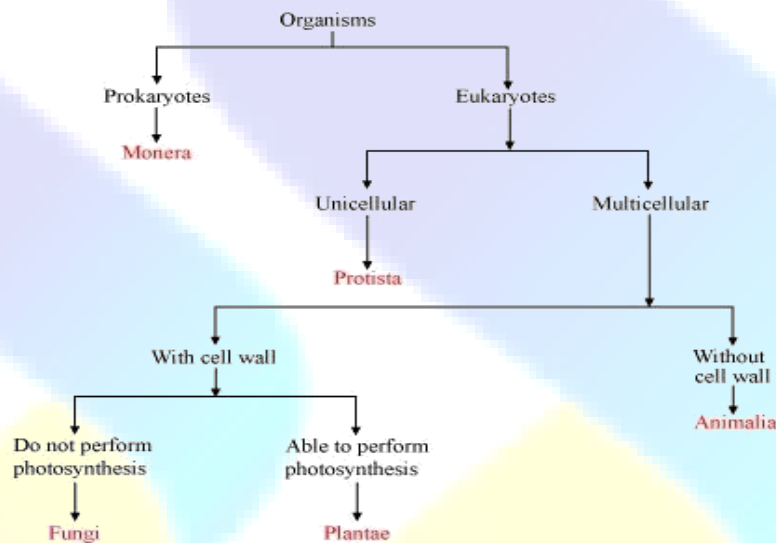
The basis for grouping organisms into five kingdoms is as follows.

(i) On the basis of the presence or absence of membrane-bound organelles, all living organisms are divided into two broad categories of eukaryotes and prokaryotes. This division lead to the formation of kingdom Monera, which includes all prokaryotes.

(ii) Then, eukaryotes are divided as unicellular and multicellular, on the basis of cellularity. Unicellular eukaryotes form kingdom Protista, and multicellular eukaryotes form kingdom Fungi, Plantae, and Animalia.

(iii) Animals are then separated on the basis of the absence of a cell wall.

(iv) Since fungi and plants both contain a cell wall, they are separated into different kingdoms on the basis of their modes of nutrition. Fungi have saprophytic mode of nutrition, whereas plants have autotrophic mode of nutrition. This results in the formation of the five kingdoms.



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

Ans. The kingdom Plantae is divided into five main divisions. Thallophyta, Bryophyta, Pteridophyta, Gymnosperms, and Angiosperms.

The classification depends on the following criteria.

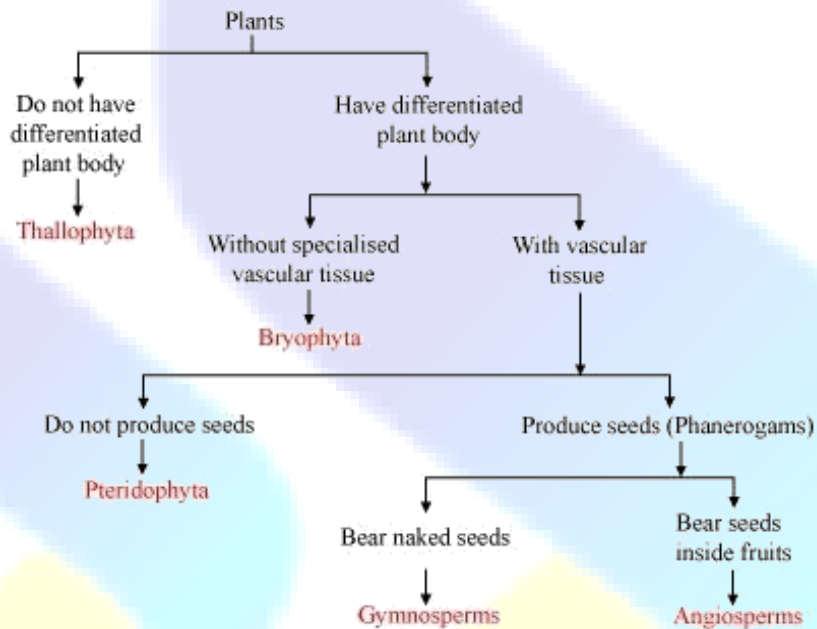
- Differentiated/ Undifferentiated plant body
- Presence /absence of vascular tissues
- With/without seeds
- Naked seeds/ seeds inside fruits

(i) The first level of classification depends on whether a plant body is well differentiated or not. A group of plants that do not have a well differentiated plant body are known as Thallophyta.

(ii) Plants that have well differentiated body parts are further divided on the basis of the presence or absence of vascular tissues. Plants without specialised vascular tissues are included in division Bryophyta, whereas plants with vascular tissues are known as Tracheophyta.

(iii) Tracheophyta is again sub-divided into division Pteridophyta, on the basis of the absence of seed formation.

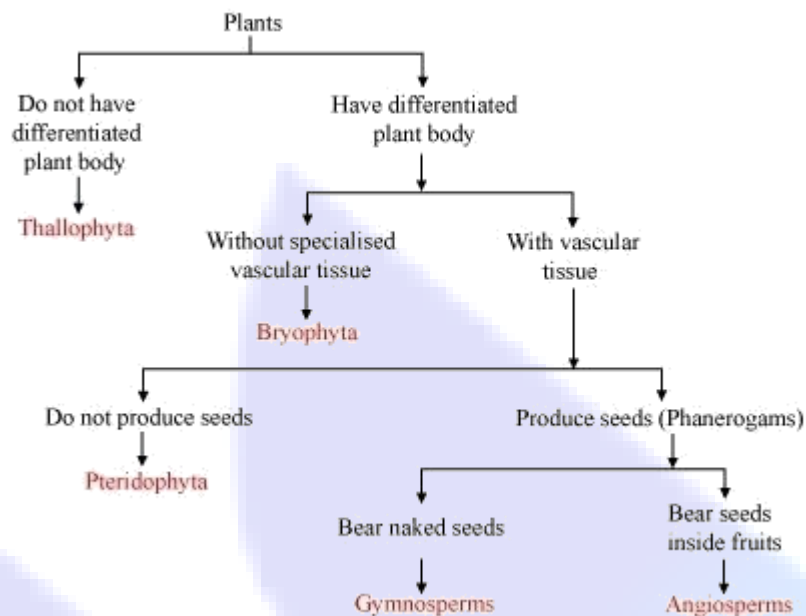
(iv) The other group of plants having well developed reproductive organs that finally develop seeds are called Phanerogams. This group is further sub- divided on the basis of whether the seeds are naked or enclosed in fruits. This classifies them into gymnosperms and angiosperms. Gymnosperms are seed bearing, non-flowering plants, whereas angiosperms are flowering plants in which the seeds are enclosed inside the fruit.



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

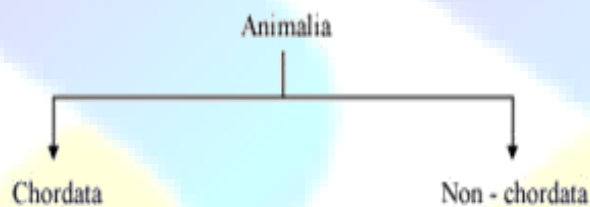
Ans. Criteria for deciding divisions in plants are.

- (i) Differentiated/ Undifferentiated plant body
- (ii) Presence/ absence of vascular tissues
- (iii) With/without seeds
- (iv) Naked seeds/ seeds inside fruits



Criteria for deciding subgroups among animals are.

Kingdom Animalia is divided into two major groups on the basis of the presence or absence of a notochord.

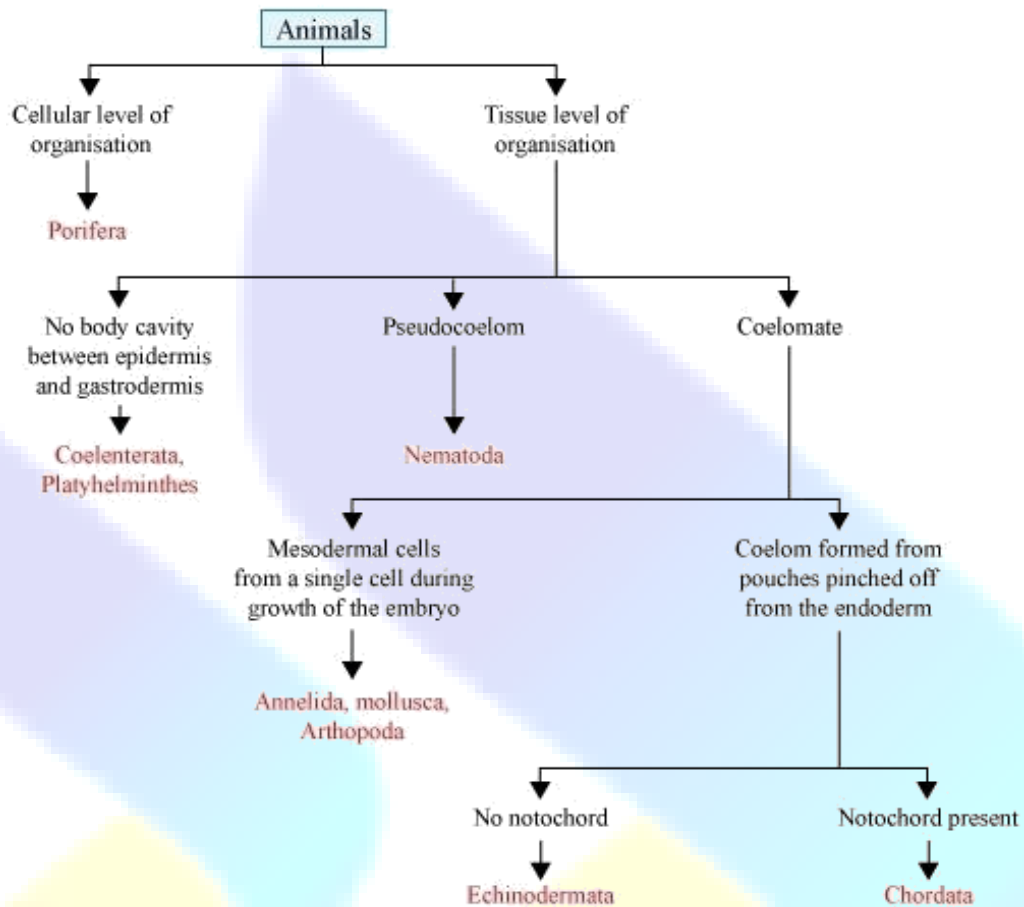


Non-chordates do not possess a notochord, while all members of the phylum chordates possess a notochord.

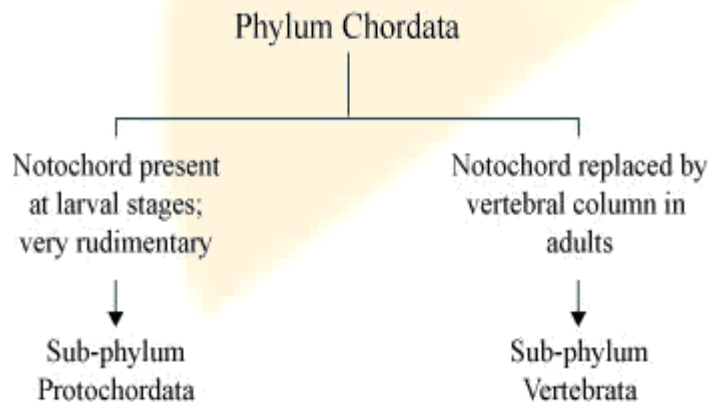
Non-chordate is further divided into subgroups on the basis of the following features.

1. True Tissue [Absent
present
2. Body Cavity [Absent
present
3. Type of body symmetry [Radial
Bilateral
4. Type of coelom development [Acoelom
Pseudocoelom
True Coelom
5. Type of true coelom [Enterocoelom
Schizocoelom

On the basis of the above features, non-chordates are divided into the following subgroups. Porifera, Coelenterate, Platyhelminthes, Nematodes, Annelids, Molluscs, Arthropoda, and Echinodermata.

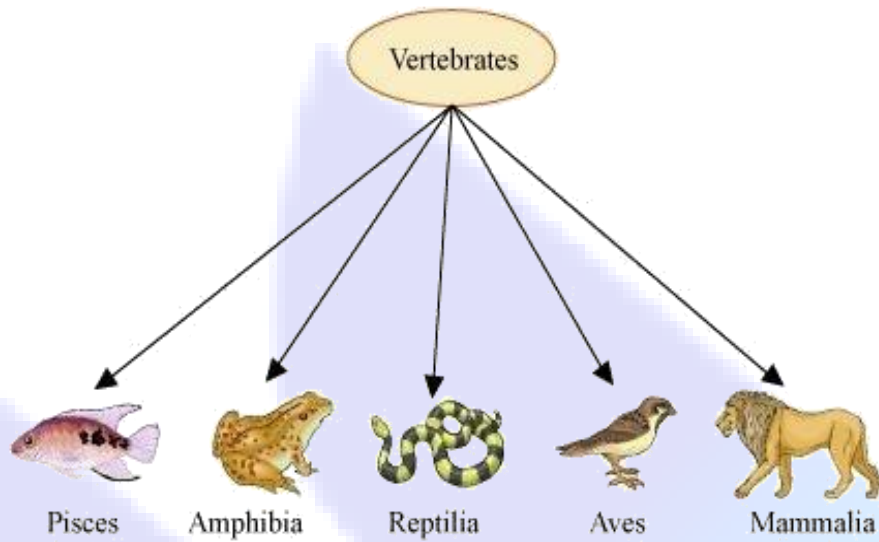


All members of the phylum chordate possess a notochord. However, some animals such as *Balanoglossus*, *Amphioxus*, *Herdmania*, etc. have a notochord, which is either absent or does not run the entire length of the animal's body. Therefore, these animals are kept in a separate sub-phylum called Protochordata, and the rest of the chordates are included in the sub-phylum vertebrata. The members of the sub-phylum vertebrata are advanced chordates. They are divided into five classes. Pisces, Amphibian, Reptilia, Aves, and Mammalia.



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

Ans. Animals in Vertebrata are classified into five classes.



(i) **Class Pisces.** This class includes fish such as *Scoliodon*, tuna, rohu, shark, etc. These animals mostly live in water. Hence, they have special adaptive features such as a streamlined body, presence of a tail for movement, gills, etc. to live in water.

(ii) **Class Amphibia.** It includes frogs, toads, and salamanders. These animals have a dual mode of life. In the larval stage, the respiratory organs are gills, but in the adult stage, respiration occurs through the lungs or skin. They lay eggs in water.

(iii) **Class Reptilia.** It includes reptiles such as lizards, snakes, turtles, etc. They usually creep or crawl on land. The body of a reptile is covered with dry and cornified skin to prevent water loss. They lay eggs on land.

(iv) **Class Aves.** It includes all birds such as sparrow, pigeon, crow, etc. Most of them have feathers. Their forelimbs are modified into wings for flight, while hind limbs are modified for walking and claspings. They lay eggs.

(v) **Class Mammalia.** It includes a variety of animals which have milk producing glands to nourish their young ones. Some lay eggs and some give birth to young ones. Their skin has hair as well as sweat glands to regulate their body temperature.