

NCERT Exercise**Question 1:**

Why are living organisms classified?

Solution 1:

Living organisms need to be classified or put into separate categories to make their study easier. The diversity of living beings makes it a challenge to systematically study them. Classification is a helpful tool to categorize them based on certain common characteristics. This enables scientists to study them in a more systematic way. The study of living beings is essential for the benefit of humankind. Discovery of new medicines, and better yielding crop varieties can be made possible only by systematic study of living beings. Moreover, environmental protection also makes it necessary for us to study the living beings in a systematic way. Taxonomy is the branch of biology which deals with classification, identification and nomenclature of living organisms.

Question 2:

Why are the classification systems changing every now and then?

Solution 2:

Millions of plants, animals, and microorganisms found on earth, have been identified by the scientists while many new species are still being discovered around the world. Therefore, to classify these newly discovered species, with new characters, new systems of classification have to be devised every now and then. This creates the requirement to change the existing systems of classification.

Question 3:

What different criteria would you choose to classify people that you meet often?

Solution 3:

In our day to day life we categorize people based on the basis of level of education, profession, hobbies, native place, sex etc.

Question 4:

What do we learn from identification of individuals and populations?

Solution 4:

In a diverse country like India we can learn from identification of individuals and populations about the native place, mother tongue, costumes, food habit, religion, caste, etc.

Question 5: Given below is the scientific name of Mango. Identify the correctly written name.

Mangifera Indica

Mangifera indica

Solution 5:

In binomial system of nomenclature, the generic name of a species always starts with a capital letter whereas the specific name starts with a small letter. Therefore, the correct scientific name of mango is *Mangifera indica*.

Question 6:

Define a taxon. Give some examples of taxa at different hierarchical levels.

Solution 6:

A particular level of hierarchy in the classification of living beings is called a taxon. For example, the basic level of classification is species, followed by genus, family, order, class, phylum or division, in ascending order.

Question 7:

Can you identify the correct sequence of taxonomical categories?

- (a) Species → Order → Phylum → Kingdom
- (b) Genus → Species → Order → Kingdom
- (c) Species → Genus → Order → Phylum

Solution 7:

Both (a) and (c) represent correct sequences of taxonomic categories as the correct hierarchical arrangement of taxonomic categories in ascending order is Species, Genus, Family, Order, Phylum and Kingdom. In sequence (b) species should be included instead of genus because species is the basic unit of classification. Therefore, it does not represent the correct sequence.

Question 8:

Try to collect all the currently accepted meanings for the word species. Discuss with your teacher the meaning of species in case of higher plants and animals on one hand and bacteria on the other hand.

Solution 8:

In biological terms, species is the basic unit of classification. It can be defined as a group of similar organisms capable of interbreeding freely among themselves under natural conditions to produce fertile offsprings. Species can also be defined as group of individuals that share the same gene pool.

Question 9:

Define and understand the following terms:

Solution 9:

- (i) Phylum: A group of closely related classes is called phylum. For example: pisces, amphibia, reptilia, aves and mammalia belong to the Phylum Chordata. In case of plants, classes with a few similar characters are assigned to Division instead of Phylum.
 - (ii) Class: The group of closely related orders is called class. For example: orders Primata and Carnivora belong to the class Mammalia.
 - (iii) Family: A group of closely related genera is called a family. For example: family hominidae contains Apes, Monkeys and Man. In plants, families are categorized on the basis of vegetative and reproductive features.
 - (iv) Order: A group of closely related families is called order. For example: order Carnivora, includes many families like Felidae and Canidae.
 - (v) Genus: A group of closely related species is called genus. For example: genus Solanum, includes many species such as nigrum, melongena, tuberosum, etc.
-

Question 10:

is a key helpful in the identification and classification of an organism?

Solution 10:

Key is a taxonomical aid used for identification of plants and animals based on the similarities and dissimilarities. The keys are based on contrasting characters generally in a pair called couplet. Selection of one character leads to rejection of another character while identifying a particular species or genera or family and so on. For example presence or absence of hair on body can give a clue if an animal belongs to mammals or not. Separate taxonomic keys are required for each taxonomic category such as family, genus and species for the purpose of identification.

Question 11:

Illustrate the taxonomical hierarchy with suitable examples of a plant and an animal.

Solution 11:

Classification of a plant

As an example, let us classify Mango

- Class: Dicotyledons
- Order: Sapindales
- Family: Anacardiaceae
- Genus: *Mangifera*
- Species: *indica*

Classification of a animal

As an example, let us classify Humans

- Phylum: Chordata
 - Class: Mammalia
 - Order: Primata
 - Family: Hominidae
 - Genus: *Homo*
 - Species: *sapiens*
-