

1. Why are living organisms classified?**Solution:**

The earth contains millions of organisms, and we may know the plants and animals that live near us by their native names. These local names vary from place to place within a country. This leads to confusion in identifying and studying specific species. Therefore, it must be called by common name throughout the world to standardize the nomenclature and study of organisms. To achieve this, organisms are named and categorized according to their roles.

2. Why are the classification systems changing every now and then?**Solution:**

Scientific study is ever a work in progress and new species and organisms are often added. The initial system of classification focuses only on habit and habitat of organisms. Gradually external morphology became a toll for classification. After this, the morphology and embryology are taken into account, followed by the phylogenetic relationship, the cytology of the organism. Modern-day uses biochemical techniques to classify the organisms based on their nucleic acid components.

3. What different criteria would you choose to classify people that you meet often?**Solution:**

The people we meet most often are categorized by characteristics such as gender, skin color, education, career, hobbies, and nature.

4. What do we learn from the identification of individuals and populations?**Solution:**

By identifying individuals and populations, we learn the following things

- (i) Sex
- (ii) Skin colour
- (iii) Native place
- (iv) Mother tongue
- (v) Food habit
- (vi) Religion
- (vii) Caste

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

Mangifera Indica

Mangifera indica

Solution:

The answer is *Mangifera indica*. Here mangifera is its genus name, and indica is its

species name which is always written in lowercase.

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

Solution:

A taxon is a level of hierarchy in the system of classifying organisms.

Following are the hierarchical levels.

- (i) Kingdom
- (ii) Phylum
- (iii) Class
- (iv) Order
- (v) Family
- (vi) Genus
- (vii) Species

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:

From the given options (a) and (c) is the correct sequence of taxonomical categories.

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:

A group of individual organisms with basic similarities is called species. This is the basic unit of classification. Species are defined as individuals who share the same gene pool. Higher plants and animals: Criteria of reproductive isolation can be used to classify the species.

Bacteria: interbreeding and reproductive isolation cannot be used in case of bacteria here gene pool can be used to classify species.

9. Define and understand the following terms:

(i) Phylum (ii) Class (iii) Family (iv) Order (v) Genus

Solution:

i) Phylum is a taxonomical hierarchy below Kingdom and above Class. It is a taxon with one or more classes organisms with similar characters.

ii) Class is a taxonomical hierarchy higher than Order and lower than Phylum. Class

includes related to orders of the organisms. Example: Presence of notochord in mammals.

iii) Family has a group of related genera with still less number of similarities as compared to genus and species. Example: Fox and dog belongs to the same family. It is a group of entities below Order and above Genus.

iv) Order is a taxon below higher than Family and lower than class. Order being a higher category is the assemblage of families which exhibit a few similar characters.

v) Genus comprises a group of related species which has more characters in common in comparison to species of other genera. Ex: Lion, tiger and leopard are classified under genus *Panthera*. It is above species and below family.

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

Solution:

The key is a taxonomic aid used to identify plants and animals, based on similarities and dissimilarities. It represents the choice between two opposite characters. This is useful for identifying contrasting characters. They are two contrasting characters, where one character's choice rejects another when the species, family, or genera is identified. If the entity is not already recorded, efforts are made for the first verification and reconsider its discovery before naming it. Therefore, each entity can be classified as it is known or unknown.

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

Solution:

The table below depicts the taxonomic hierarchy with wheat as an example for the plant and the human as an example for animal.

Taxonomic categories	Wheat	Human
Kingdom	Plantae	Animalia
Phylum/Division	Angiospermae	Chordata
Class	Monocotyledonae	Mammalia
Order	Poales	Primata
Family	Poaceae	Homonidae
Genus	Triticum	Homo
Species	Triticum aestivum	Sapiens