Kingdom of Bahrain
Ministry of Education

Pakistan School
Kingdom of Bahrain


Welcome to Biology!
Biology

BIOLOGY

9

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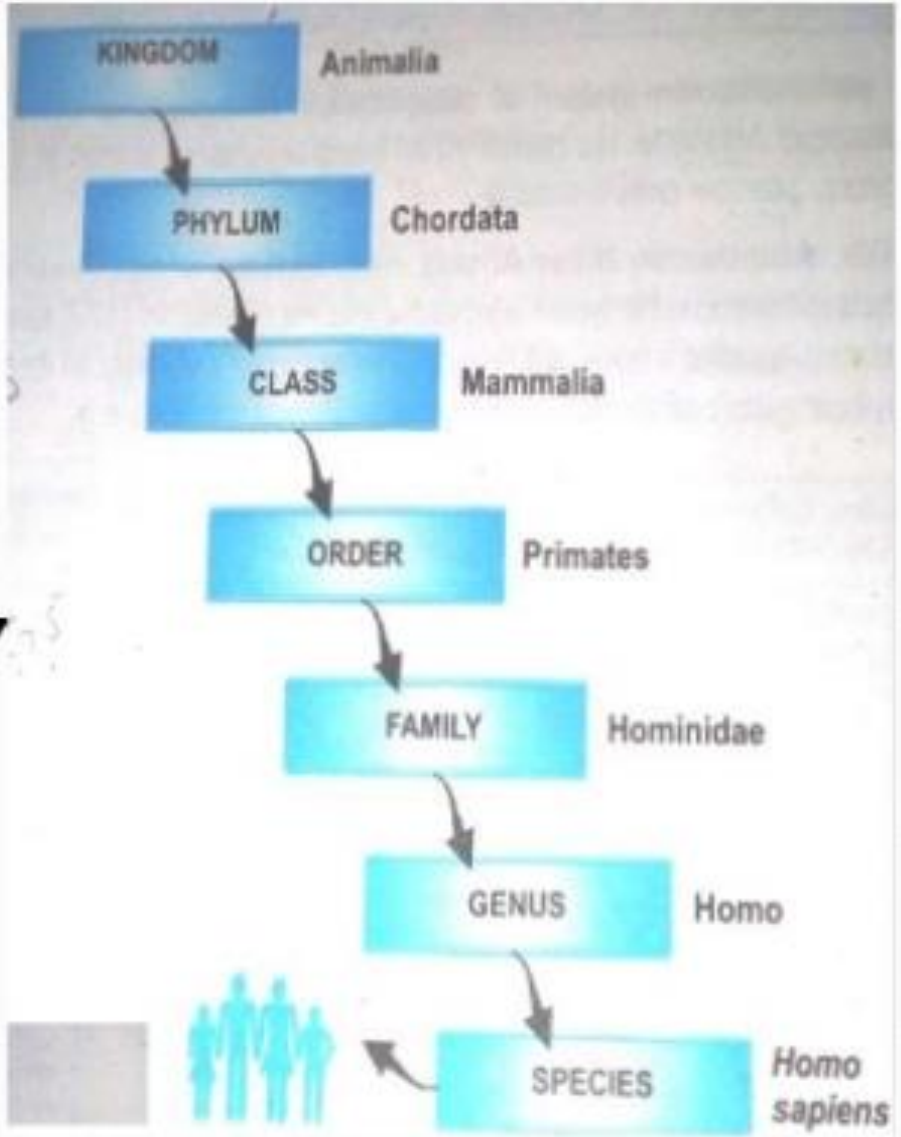
CHAPTER 3

BIODIVERSITY



ENGAGING STARTER

Learning Objective

At the end of the Lesson students will be able to;

- Explain **basis of classification based on relationship and similarities and differances.**
- Identify 7 levels of classification from largest to smallest (kingdom to species).
- **Explain two and three kingdom classification and identify the drawbacks of these systems.**

- Chapter #3 Page # 33 - 37

Topics: Basis of classification

Taxonomic hierarchy

Species **the basic unit of classification**

Two Kingdom classification sys..

Three Kingdom classification sys..

Basis of classification of living organisms

The main characteristics which are considered for classification of living organisms into different groups are :-

- Whether they are made of prokaryotic or eukaryotic cells.
- Whether the cells occur singly or they are grouped together and live as an indivisible group.
- Whether they produce their own food by photosynthesis or get their food from outside.
- Of the organisms which produce their own food (plants) what is the level of organisation of their body ?
- Of the animals what is the level of organisation of their body and what are their special organs and their functions ?

The characteristics used for classification of plants will be different from the characteristics used for classification of animals because plants make their own food and animals get their food from outside.

Aims of Classification

The branch of biology which deals with classification is called **taxonomy** and the branch which deals with classification and also traces the evolutionary history of organisms is known as **systematics**. The main aims of both these branches are;

- To determine similarities and differences among organisms so that they can be studied easily.
- To find the evolutionary relationships among organisms.

Basis of Classification

Classification is based on relationship amongst organisms and such relationship is got through similarities in characteristics. These similarities suggest that all organisms are related to one another at some point in their evolutionary histories.

However, some organisms are more closely related than others. For example sparrows are more closely related to pigeons than to insects. It means that the former two have common evolutionary histories. When biologists classify organisms into groups and subgroups, the similarities are seen in external and internal structures and stages of development. Modern genetics provides another type of information to taxonomists. The similarities and differences in the DNA of two studied organisms can be used for getting idea about similarities and differences in their structures and functions.

Basis of Classification: Classification is based on relationship among organisms and such relationship is got through similarities in the form or structure.

These similarities are seen in:-

1. Structures (both external and internal)
2. Biochemistry
3. Modern Genetics

These similarities suggest that all organisms are related to one another at some point in their evolutionary histories. However, some organisms are more closely related than others. For example; sparrows are more closely related to pigeons than to insects. It means sparrows and pigeons have common evolutionary histories.

e hierarchy of classification – Groups :-

- Living organisms have been broadly classified into five main kingdoms.
- They are :-

  i) Monera ii) Protista iii) Fungi iv) Plante v) Animalia
- Each kingdom has been further classified into smaller sub - groups at various levels as :-

  Kingdom

  Phylum (for plants) / Division (for animals)

  Class

  Order

  Family

  Genus

  Species

taxonomic hierarchy

Taxa

The groups into which organism are classified are known as taxonomic categories or taxa.

Taxonomic Hierarchy

The taxa form a ladder called taxonomic hierarchy.

All the organisms are divided into five kingdoms. So kingdom is the largest taxon. On the basis of similarities, each kingdom is further divided into smaller taxa in the following way:

Phylum: A phylum is a group of related classes.

Class: A class is a group of related orders.

Order: An order is a group of related families.

Family: A family is a group of related genera.

Genus: A genus is a group of related species.

Species: A species consists of similar organisms.

Table 3.1 Simple classification of two organisms

Taxa	Human	Pea
Kingdom	Animalia	Plantae
Phylum / Division	Chordata	Magnoliophyta
Class	Mammalia	Magnoliopsida
Order	Primates	Fabales
Family	Hominidae	Fabaceae
Genus	*Homo*	*Pisum*
Species	*H. sapiens*	*P. sativum*

SPECIES

- The basic unit of classification is species.
- One kind of organisms that can mate with each other and produce fertile offspring.
- The members of organisms of two different species cannot interbreed.
- The off spring produced in interspecific breeding may be fertile.
- Eg; tiger-a species named tigris

Classification

Homo sapiens sapiens

Kingdom	Animalia
Phylum	Chordata
Class	Mammalia
Order	Primates
Family	Hominidae
Genus	*Homo*
Species	*Sapiens*
Subspecies	*Sapiens*

Two Kingdom system of classification.

It is the oldest system and classifies all organisms into two Kingdoms i.e, plantae and animalia.

Plantae: All organisms that can prepare food from simple inorganic materials and thus can store energy are autotrophs. According to this system bacteria, fungi and algae were included in kingdom plantae.

Animalia: The organisms that cannot synthesize their food and depend on autotrophs or others are heterotrophs and are included in kingdom animalia.

Drawbacks

(i) Some taxonomists found this system unworkable because many unicellular organisms like Euglena have both plant-like (Presence of Chlorophyll) and animal-like (Heterotrophic mode of nutrition in darkness and lack cell wall) characters. So, there should be a separate kingdom for such organisms.

(ii) This system also ignores the difference between organisms having prokaryotic and those having eukaryotic cells.

Three Kingdom Classification System.

In 1866, Ernst Hackel solved the first objection and proposed a third kingdom, protista, for the placement of Euglena like organisms. He included a kingdom protista. In this system, fungi were still in the kingdom plantae.

Drawbacks

(i) This system did not clear the difference between prokayotes and eukaryotes.

(ii) Some biologists disagreed about the position of fungi in kingdom plantae. Fungi resemble plants in many ways but are not autotrophs. They are special form of heterotrophs that get their food by absorption. They do not have cellulose in their cell walls rather possess chitin.

Worksheet:01

1. **Smallest taxon of classification is**

a. Kingdom
b. Family
c. Variety
d. Species

2. Which one of the following is not applied for fungi?

a. They are eukaryotic.
b. They are heterotrophic.
c. They are both unicellular and multicellular.
d. They possess a purely cellulosic cell wall.

3. What is a taxon?

a. A group of related families
b. A type of living organisms
c. A group of related species
d. A group of any ranking

Worksheet: Home work

Answer the following questions;

Q1. Define species.

Q2. What is the difference between the modes of nutrition of fungi and animals?

Q3. Use internet and find the classification scheme of a fungus or a bacterium.

PLENARY ACTIVITY

- Today we have done the topic_____.
- Taxonomic hierarchy is defined as_____.
- Species is _____.
- In two kingdom classification system organisms are classified in to _____ and _____.
- In three kingdom classification system fungi are classified in to kingdom_____ .
- Three kingdom classification system did not clear the difference between _____ and _____.


Any
Questions?


Thank You!
Prepared By
Shahnaz Riasat