

TOPIC 1 : ENVIRONMENTAL BIOLOGY

UNIT 1: DIVERSITY OF ORGANISMS

Learning Outcome:

Students should be able to:

- Define taxonomy
- Describe how taxonomy reflects the great diversity of life on earth.
- State the taxonomic hierarchies in correct order.
- State the five kingdoms of organisms

INTRODUCTION

- All living things are different from unicellular (one-celled) bacteria to giant whales (many celled).
- These organisms are different in size but they have similar cell structures. This shows that all organisms share a common evolutionary ancestry.
- There is a great diversity in living things. Living things varies from plants to animals. Some lives on land, some lives in the ocean.
- However, looking around us, it is obvious that some organisms are more alike than others.
- To work out just how closely related organisms are to each other, their fossil histories, body structures, DNA and even their behaviors may need to be compared.



Carolus Linnaeus (1707 – 1778)

- Swedish scientist who was a collector of all types of organisms.
- He invented the classification system used for classifying living things.

Taxonomy – the study of classifying living things into their Kingdom, Phylum, Class, Order, Family, Genus and Species.

Classification System

- Organisms have been categorized according to their level of similarity in order to study them easily using the classification system shown below:

Less similarity

More similarity

Kingdom → Phylum → Class → Order → Family → Genus → Species

- If two species are compared, and they are high up in the classification system, then those two species shows **less** similar characteristics compared to any two species that are lower down the classification system.

- In other words, the lower the level, the more similar and evolutionary closer are the members of that level.

Examples: Classification of Human and Plant

Classification Group	Human
Kingdom	Animal
Phylum	Chordata (have backbone)
Class	Mammals (warm-blooded, hairy, suckle young)
Order	Primates (monkeys, apes)
Family	Hominids (large brain, 'intelligent', walk upright)
Genus	Homo (human)
Species	sapiens ('intelligent')

Classification Group	Plant
Kingdom	Plantae
Phylum	Tracheophyta (vascular plants)
Class	Angiospermae (flowering plants)
Order	Rosales(roses)
Family	Rosaceae
Genus	<i>Rosa</i>
Species	<i>Rosa gallica</i>

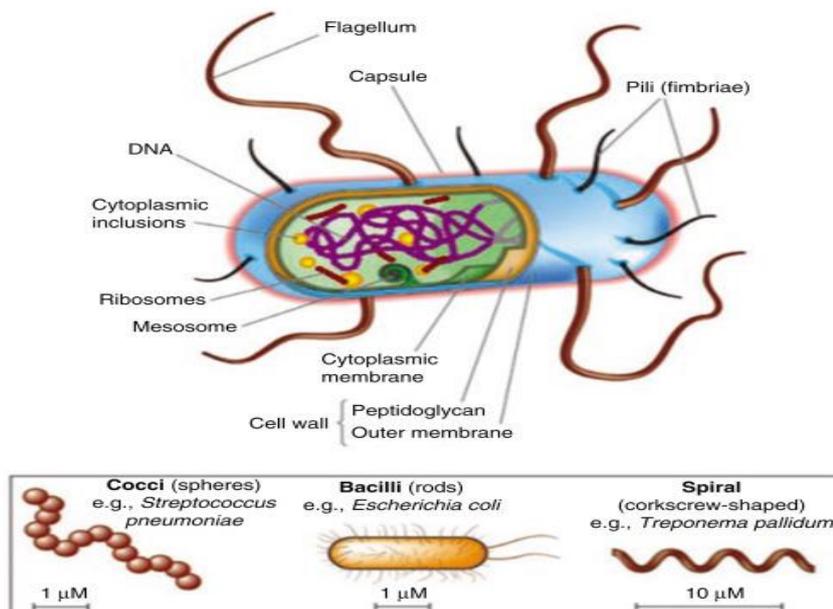
1. KINGDOM

- Kingdoms are the **widest** level of classification.
- These are the 5 major kingdoms:
 - Kingdom Monera
 - Kingdom Protista
 - Kingdom Fungi
 - Kingdom Plants
 - Kingdom Animals
- All living things on earth belong to one of the five major kingdoms listed above.

(i) Kingdom Monera

- Blue green algae (now known as cyanobacteria) and bacteria belong to this group.
- They are unicellular (one-celled) organisms that have no true nucleus i.e they don't have a nuclear membrane around the nucleus.
- They are referred to as **prokaryotes**.

For example: The following unicellular bacteria belong to the monera kingdom.



(ii) **Kingdom Protista**

- They are unicellular organisms that have a true nucleus.
- Some are 'animal-like' such as *amoeba* that cause dysentery and meningitis, while others are 'plant-like' such as *euglena sp*, which have chloroplasts and can photosynthesize.

(iii) **Kingdom Fungi**

- Mildews, ringworms, moulds, mushrooms and toadstools all belong to the Fungi kingdom.
- Fungal cells have a cell wall like plant cells, but they can not make their own food from photosynthesis as they **do not have** chlorophyll.
- Fungi are either **saprophytic** (live off dead materials) or **parasitic** (live off living materials)



(iv) **Kingdom Animalia**

- Animals are **heterotrophs** because they feed off other organisms and cannot make their own food.
- Animals are usually **motile** (able to move).

(v) **Kingdom Plantae**

- Plants are **autotrophs** (self-feeders)
- They produce their own food from photosynthesis.
- Plant cells have a cell wall and sap-filled vacuoles.



NOTE:

We will focus **ONLY** on the last two kingdoms in this topic which is the Plant & Animal Kingdom. The rest of the notes for this unit will be given to you on the following week. Make sure you study this note and do the self-check given below. If you have any questions, feel free to contact my mobile number: (+676)7710288

Self-check #1: Classification and Kingdoms

1. Define Taxonomy.
2. Describe how taxonomy reflects the great diversity of life on earth.
3. The following are categories used in the classification of living organisms:
1, Class 2. Family 3. Order
4. Species 5. Genus 6. Phylum/Division
7. Kingdom

The correct order from widest to narrowest category is:

- A. 7, 1, 3, 4, 2, 5, 6
 - B. 7, 6, 2, 1, 3, 5, 4
 - C. 7, 6, 1, 3, 2, 5, 4
 - D. 7, 1, 3, 6, 2, 4, 5
4. Moving down the classification table from kingdom to species there is increasing:
A. Diversity among individuals
B. Similarity among individuals
C. Individuality
D. Activity

Question 5 are based on the table below:

	Organism 1	Organism 2	Organism 3	Organism 4
Phylum	Arthropods			
Class	Hexapoda			
Order	Lepidoptera	Lepidoptera		
Family	Nymphalids	Lycaends		Nymphalids
Genus	<i>Danaus</i>	<i>Zizera</i>	<i>Danaus</i>	<i>Vanessa</i>
Species	<i>plexippus</i>	<i>labradus</i>	<i>Hamata</i>	<i>gonerilla</i>

5. Which organisms belong to the same family?
A. 1 and 4 only C. 1, 3 and 4 only
B. 3 and 4 only D. 1 and 2 only
6. Which organism would you expect to be most like organism 1?
A. 2 C. 4
B. 3 D. Both 3 and 4
7. State the five kingdoms of organisms.