Week 2

Zoology and botany have also specialized separately with different sub-branches.

Major branches of zoology:

- **Protozoology:** Examines one-celled living beings.
- **Entomology:** Examines insects.
- **Parasitology:** Examines the internal and external parasites that live in/on the living beings.
- **Ichthyology:** Examines fish.
- **Herpetology:** Examines reptiles
- **Ornithology:** Examines animals with wings.
- **Mammalogy:** Examines mammals.
- **Anthrapology:** Examines human races in respect to evolutionary order.

Major branches of botany:

- **Virology:** Examines viruses.
- **Bacteriology:** Examines bacteria.
- **Phycology:** Examines algae.
- **Mycology:** Examines fungi.
- **Bryology:** Examines mosses.
- **Pharmacognosy:** Examines medicinal plants.

In addition to these theoretical disciplines of biology, applied disciplines are also present.

For example:

- Agriculture
- Pharmaceutical Botany
- Pharmacy
- Medical Biology etc.

- **Medical Biology:** This is a branch of biology that contains basic information that will form the fundamentals for students in the fields of Medicine, Pharmacy and Veterinary Medicine students. Therefore, Medical Biology usually tries to explain the general properties of living beings as based on humans.

Medical Biology examines the biological events that occur between birth and death. Thus, while examining the biology of humans, Medical Biology also considers the biology of animals, plants, soil, water, air due to their mutual ecological relations.

Since biology is the science of living beings, then we have to know the definition of a LIVING BEING. But before this, there are some terms worth knowing:

- **Living being**: A living creature that is born, can feed, grow and develop, be irritated and also can reproduce.

- **Plant:** Autotrophic living being made up of one or more cells. Plants have a cellulosic cell wall.

- **Animal**: Living being made up of one or more cells just like plants, however animals are heterotrophic organisms. They move actively. Their cells are only surrounded with a cytoplasmic membrane, they lack the cellulosic membrane called cell wall.

- **Species**: A group of living beings that are biologically and morphologically similar to each other, producing fertile offspring when they mate with each other and can pass their genetic characters from generation to generation.

It is also the basic unit in taxonomy.

- **Organism:** A living being that develop within a biological system, consisting of organs and organelles that affect each other.

- **Individual**: The single example of a species that lives alone, in respect to development, structure and function. It is an organism that has species-specific properties with a given shape, size and structure.

- **Taxon:** The name of each group in the classification of living beings.

- **Taxonomy (Systematics)**: The science that examines living beings separately and determines their similarities and differences and then classifies them into groups such as species, genus, family, order etc. according to their origins, relationships and phylogenetic developments.

- **Population**: *A gathering of individuals living in the same regions.*

- **Community**: *A group of populations. It is a group of living beings found within a certain region.*

- **Habitat**: The environment that provides place, and food for a living being (organism) to survive.

- **Niche**: Biological function of a living being (organism). (Function of each living being within a community) (The role of an organism in the habitat).

COMMON AND TYPICAL CHARACTERS OF LIVING BEINGS

Living beings can be differentiated from non-living beings with the following properties:

1. **Individualism:** All living beings have specific shapes that never change. E.g. when we think about a human, a cat, a bird, a tulip etc., the image (shape) that we conjure up in our minds are distinct and specific.

2. **Structural properties**: Though external appearances of living beings vary from each other, they are similar to each other in respect to their internal structures.

For example:

- All living beings are made up of cells.
- In general, a vital fluid called cytoplasm and a nucleus is present in every cell.
- All living cells are made up of carbohydrates, proteins, lipids, nucleic acids, enzymes and vitamins.

3. **Physiological properties**: Physiological events taking place in living beings are also similar to each other.

- **Anabolism:** Substances taken from outside and assimilated are converted to the substances that are found within the structure of the living beings like carbohydrates, lipids and proteins that have high molecular weights ad energies when burned.

- **Catabolism:** Big molecules found in the body (foodstuff) are burned with oxygen and disintegrated into smaller molecules. Vital tasks are performed during this process with the help of the forming energy.

4. **Growth**: Living beings have the ability to grow from the inside. Addition of new tissues to the existing ones can only be accomplished with internal growth. However non-living beings do not grow from the inside, however their sizes might increase due to bulking of additional materials on them.

5. **Irritation**: It is the ability of a living being to react to an internal or external influence. For example: Staying away from danger, the need to eat something when we are hungry, a plant's turning to a light source. If living beings had lacked this ability, then they would have a less of survival.

6. **Reproduction and genetics**: All living beings that have grown to a certain in its life have the ability to produce another similar living being that. This is accomplished by some cells or gonads. Offsprings inherit various characteristics of their parents.

7. **Adaptation**: Living beings adapt themselves to the environment that they live in. However, non-living things lack this property.

8. **Death (Ex):** Living beings that lose the above mentioned characteristics die eventually.