

Lecture 1: Properties Of Living & Non Living Things

What is Biology?

A branch of science dealing with the study of life and living things.

Bio= Life **Logy**=Science

Zoology?

Deals with the study of animals

What is life?

Life is defined in the terms of characteristics of the living organism

Living Organism Kingdoms:

- 1- Bacteria
- 2- Protista
- 3- Fungi
- 4- Plantia
- 5- Animalia

Characteristics Of Life:

- 1- Are made up of cells
- 2- Grow and maintain organization
- 3- Exhibit a feature called Metabolism
- 4- Posses hemostatic mechanisms (maintain hemostasis)
- 5- They sense & respond to changes in the environment
- 6- They are capable of reproduction, development & growth
- 7- They can mutate and adapt
- 8- They are part of earths eco systems

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1-All living organisms are made of cell/s

Unicellular: ex. Bacterium

Multicellular: ex. Humans

The Cell:

Cells are tiny structures that are the fundamental building blocks of living organisms.

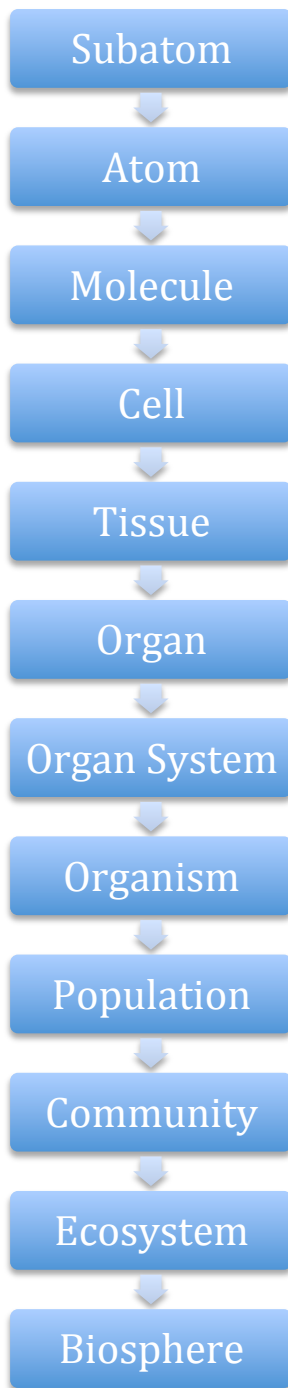
(Cells are the basic unit of life)

- They form the structural and functional unit of an organism
- Properties of life emerge at the level of the cells
- All living cells have DNA in them

DNA (deoxyribonucleic acid):

- Genetic material that contains information on reproduction, growth, heredity, and development.
- Flow from one generation to the next, making the offspring like parents (inheritance)
- All living organisms grow & maintain their complex organization.

Levels Of Organization In Nature:



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Ecosystems: Biotic + Abiotic factors.

2-Living Organisms Grow & Maintain Their Organization:

by taking in molecules & energy from surroundings

- 70% - 80% of the energy adults need is used to maintain their bodies.
- To transport molecules in & out of the cells
- Make proteins in the cells & to perform other basic body functions
- The rest of the energy is used for other activities (ex. walking & talking)

3- Exhibit A Feature Called Metabolism:

Metabolism: Refers to the chemical reactions in the cells & tissues of organisms

Metabolism involves: getting, converting & using of energy

Metabolic Types

Anabolism	Catabolism
Building up process	Breaking up process
Builds complex substances from single ones	Breaks complex substances into simple ones
Energy is synthesized	Energy is released
e.g. Photosynthesis	e.g. Respiration
CO₂ + H₂O + Sun → Glucose + O₂ + Energy (ATP)	Glucose + O₂ → CO₂ + H₂O + ATP

4- All Living Organisms Posses Hemostatic mechanisms:

Hemostasis: The state of relative constancy that helps ensure human health (Dynamic state)

- It's the state in which an organism's internal environment is maintained within tolerable range for cell activities.

5- Living Things Sense & Respond To Changes In The environment:

- Differentiate between **sensation & response:**

Sensation	Response
The ability to detect a stimulus by a receptor	The reaction to stimulations by effectors

Stimulus: Specific form of energy detected by a receptor
e.g. (Light, heat, hormones)

Receptors: structure, cell, or organ receiving stimulus

Effectors: Organ Cells Responding to stimuli

6- Living Things are capable of reproduction, growth and development:

Reproduction: Production of new individuals (offspring)

Types Of Reproduction:

Sexual	Asexual
Involves two parents. Egg is fertilized by sperm to make a zygote (e.g. Humans)	Involves a single organism or cell (e.g. Bacteria by binary fission)
Offspring different from parents	Offspring identical to parents

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Growth: It's an increase in weight & size

Development: Many stages and many phases in life's cycle.

- Transformation of fertilized egg into multi-cellular organism

7- Living Organisms Can Mutate & Adapt:

Mutation: The heritable change in molecular structure of DNA

- It gives variation in details of body form, function and behavior

Mutation Could either be:

1- Harmful 2- Harmless (Beneficial)

Adaptation: The ability to fit in the changing environment & be able to survive

8- All Living Organisms Are Part Of Earth's Ecosystems:

Earth's ecosystems are life support system & important to human economy.