



Objectives

- ✿ Summarize the hierarchy of organization from simple to complex.
- ✿ Explain the characteristics of living things.
- ✿ Distinguish between metabolism and homeostasis, and growth and reproduction.
- ✿ Relate biology to your daily life.

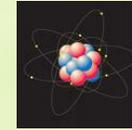


Biology

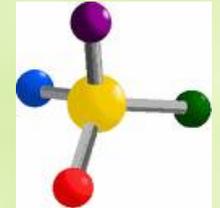
- ✿ **Biology** is the study of life.
- ✿ “*Bio*” means life, “*ology*” means to study of, or “The study of.” (Greek)
- ✿ Some sub-fields under biology include:
 - ♣ Zoology (Animals)
 - ♣ Botany (Plants)
 - ♣ Genetics (Heredity)
 - ♣ Ecology (Environment)
 - ♣ Others?

Hierarchy of Life

- Living things are built up from smaller units.
- This is known as the hierarchy of life.
- Each step is made up of the previous step.
- Each step is more complex than the previous.



Atom



Molecule



Macromolecule



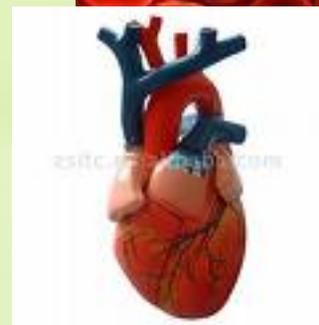
Organelle



Cell



Tissue



Organ

Organ System

Organism





What is Life?

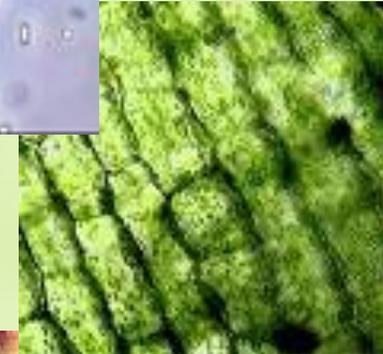
- ✿ Life can be defined by 8 distinct traits.
- ✿ ALL living things possess ALL 8 of these characteristics.
- ✿ If something possesses one of these traits, but not the others, then it is not living.

✿ Characteristics of Life:

- ✿ Made up of Cells
- ✿ Ability to Reproduce
- ✿ Based on a Genetic Code (Heredity)
- ✿ Can grow and develop.
- ✿ Obtain and use materials for energy
- ✿ Respond to their environment
- ✿ Maintain a stable internal environment.
- ✿ Change over time.

Cellular Organization

- ✿ All living organisms are made up of one or more cells.
 - ✿ Unicellular- One Cell
 - ✿ Multi-cellular - Duh!
- ✿ A cell is the smallest unit of life.
- ✿ Cells provide organization and special functions for living things. (Cells determine structure and function.)
- ✿ Organized and complex are not the same thing.





Reproduction & Heredity

- ✿ Reproduction is an organism's ability to produce offspring.
- ✿ Sexual reproduction requires 2 different organisms: a male and female.
- ✿ Asexual reproduction is the ability to produce offspring without a mate.
- ✿ Heredity is an organism's ability to pass on traits to its offspring.
- ✿ All living things contain DNA, which contains the codes for traits.
- ✿ DNA is made up of 4 different nucleotides which are the same for ALL organisms, but are simply in a different order.
- ✿ DNA is passed from parent to offspring.

Growth and Development

- ✿ Organisms change over time as a species, but rarely as individuals (Evolution.)
- ✿ As cells age and produce more organelles, the organism gets bigger (growth)
- ✿ As cells mature the ability of these cells to carry out specific function increases (Development.)
- ✿ Mature organisms have undergone growth and development to meet the needs of the species.





Metabolism

- ✿ **Metabolism** is the sum of all the chemical reactions within an organism.
- ✿ This includes the obtaining of materials (minerals, water, food, etc.) and converting them into functional energy.
- ✿ Digesting food, filtering & excreting waste are also metabolic functions.
- ✿ Some organisms convert sunlight into useful energy (photosynthesis in plants and bacteria), while others consume other organisms for their survival.



Responsiveness

- ✿ Organisms must be able to respond if something threatens its safety or if there is a stimulus that would better benefit the it.
- ✿ All organisms have differing abilities to respond to environmental conditions.
 - ✿ Movement/migration
 - ✿ Defense
 - ✿ Initiation of growth or reproduction
 - ✿ Others
- ✿ Even though a tree can't move like a human, it doesn't mean that it isn't constantly responding to what is going on around it.
 - ✿ Phototropism



Homeostasis

- ✿ All organisms must be able to maintain a consistent internal environment.
- ✿ This is known as **homeostasis**.
- ✿ The ability to maintain a certain temperature, to keep foreign objects out of the body/cells, and to fight off such invaders is homeostatic.
- ✿ An organism often uses metabolic functions to maintain homeostasis.



Why Should I Care?

- ✿ Though you may not realize it, or not yet care, Biology is a very important subject when it comes to your “everyday life”.
 - ✿ Knowing that your body needs food, water, and oxygen to survive is biology.
 - ✿ Knowing which foods are better for you and which to avoid is biology.
 - ✿ Knowing the symptoms that you are sick and what they mean is biology.
 - ✿ Attraction to members of the same species is biology.
 - ✿ Realizing how your body is changing as you get older and mature is biology.



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