Pakistan School
Kingdom of Bahrain

WELCOME

Ch.01-Introduction to biology

- Topic: THE LEVELS

OF

ORGANIZATION

Things To Consider When Shopping Building Materials

Posted in construction | *October 31, 2015*

House

OBJECTIVES OF THE LESSON

At the end of this lesson students will be able to

- **Describe the separate and comparative description of all the levels of biological organization.**

(1) Subatomic and Atomic level

(1) Subatomic and Atomic level

(a) Atoms and Elements

- All types of matter are made up of elements.
- There are about 92 kinds of elements found in nature.
- Each element is made up of a single kind of atoms ('a': not, 'tom': cut).
- These atoms are actually the structures formed by many subatomic particles.
- The most stable subatomic particles are electrons, protons and neutrons.

(b) Bioelements

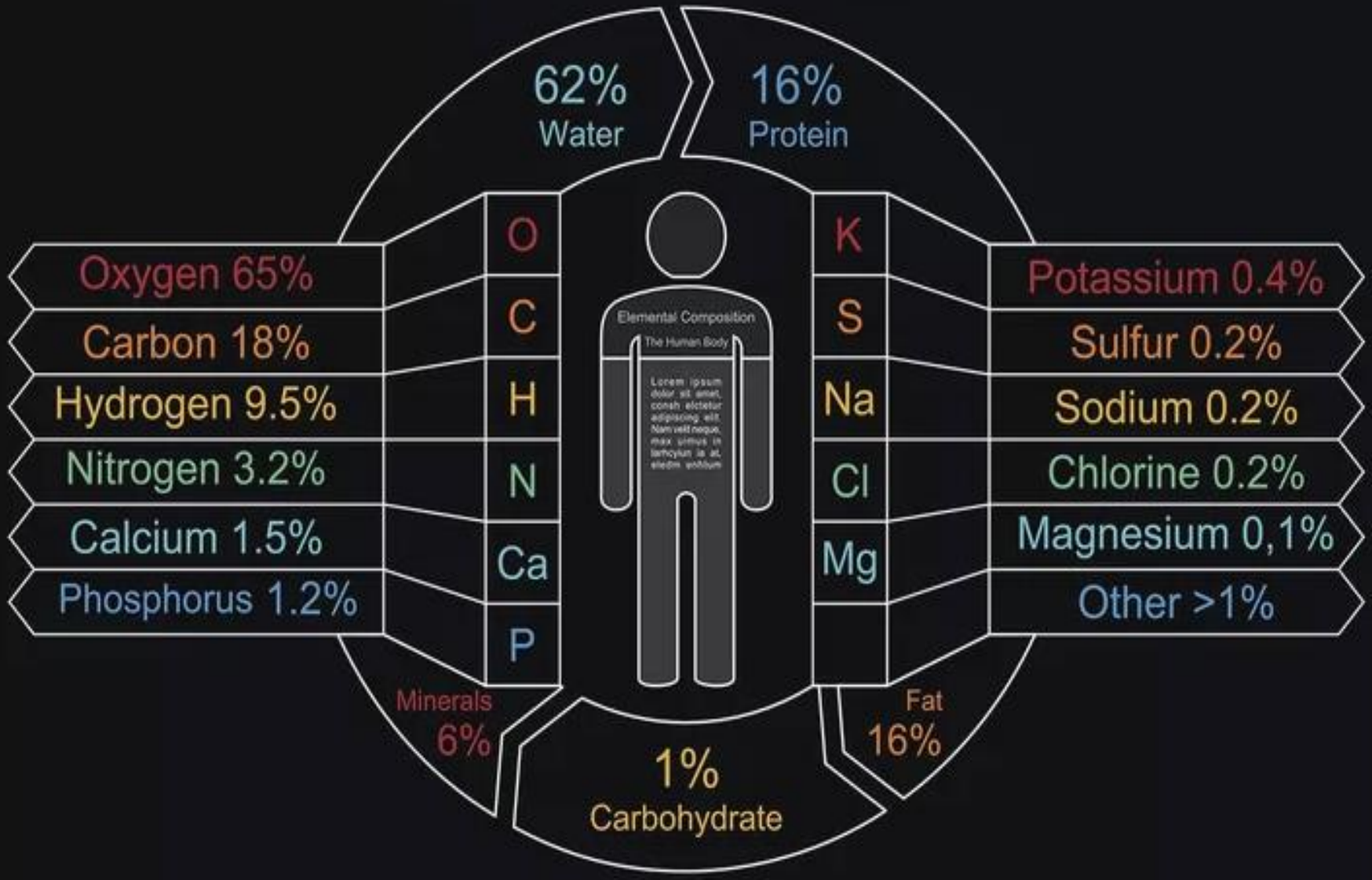
- Out of the 92 elements, 16 elements take part in making the body mass of a living organism called bioelements.
- Only six (O, C, H, N, Ca & P) make 99% of total mass. These are known as major elements.
- Other ten (K, S, Cl, Na, Mg, Fe,Cu, Mn, Zn & I) collectively make 1% of the total mass. These are called trace elements.

(i) Oxygen = 65% (ii) Carbon = 18% (iii) Hydrogen = 10%

(iv) Nitrogen = 3% (v) Calcium = 2% (vi) Phosphorous = 1%

(vii) Others = 1%

THE HUMAN BODY



ELEMENTAL COMPOSITION

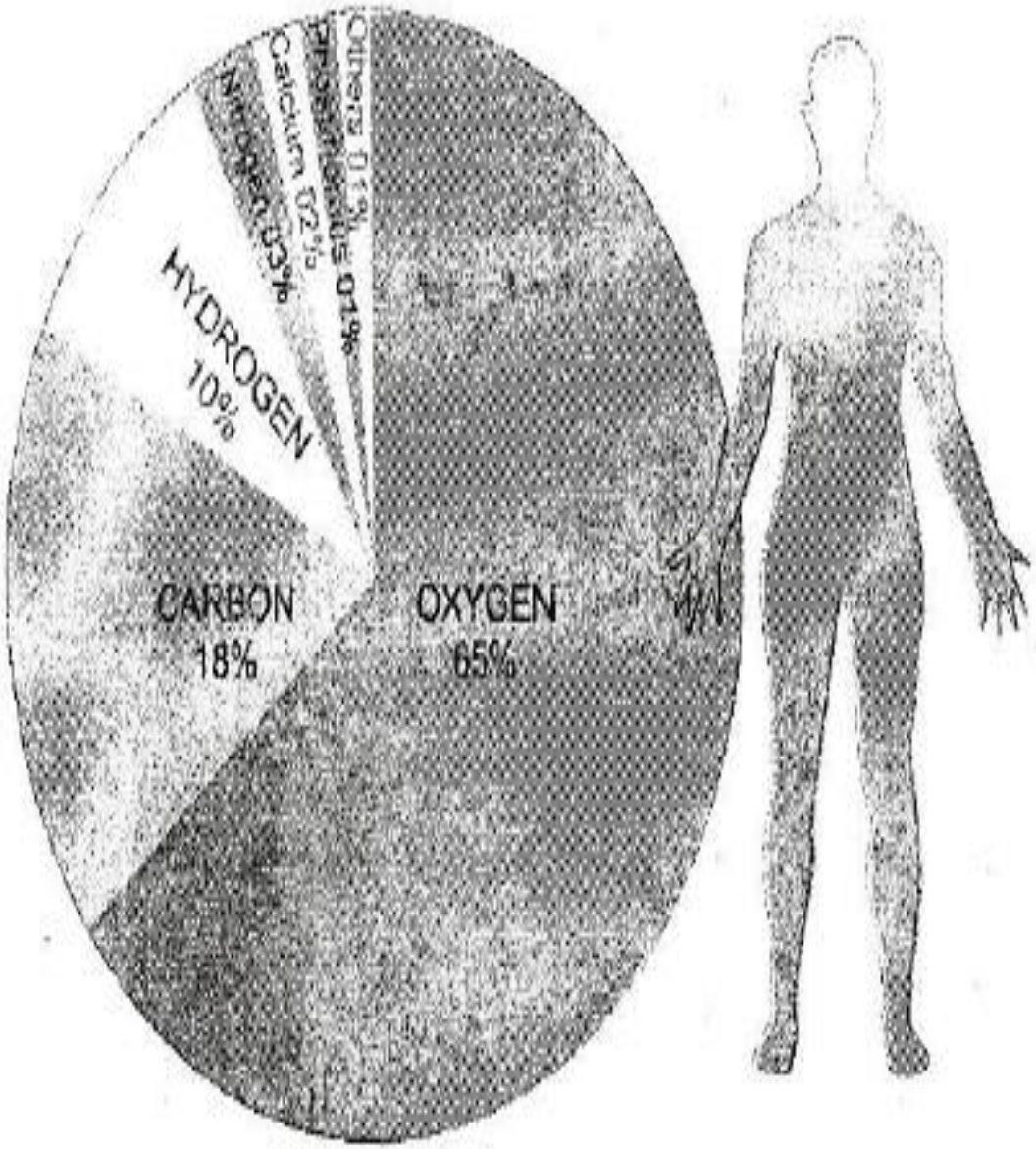
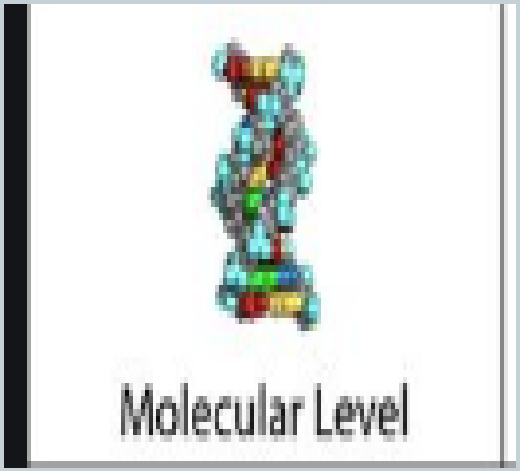


Figure 1.2: Percentage composition (by mass) of bioelements in the protoplasm of living organisms

(2) Molecular Level

- **Definition**: Atoms combine to form molecules which can have entirely different properties than the atoms they contain.
- **Examples**: water, DNA, carbohydrates etc.



Classification of Biomolecules

- Biomolecules may be classified as:

a) **Micromolecules**

These are molecules with low molecular weight e.g. glucose, water etc.

b) **Macromolecules**

These are molecules with high molecular weight e.g. starch, proteins, lipids etc.

(3) Organelle and Cell level

- (a) **Organelles formation**.

Definition; Biomolecules assemble in a particular manner to form a structure called organelles. **E.g.** Mitochondria, Endoplasmic Reticulum etc.

- (b) **Cell formation.**

Definition The organelles are sub cellular structures and assemble together to form a structure called cell.(unit of life)

E.g. Muscle cell,nerve cell etc.

Cellular Level

(4) Tissue Level

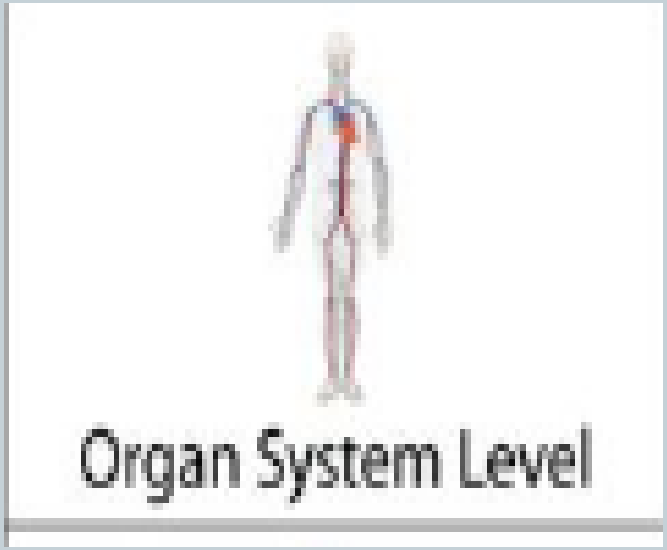
- **Definition**: Tissues are groups of cells with similar functions.
- **Example**; Muscular, epithelial, connective tissues.

(5) Organ level

- **Definition**: Organs are two or more types of tissues that work together to complete a specific task.
- **Example**: Heart, liver, stomach & kidney etc.

(6) Organ System Level

- **Definition**: An **organ system** is a group of organs that work together to perform a certain function in an organism's body.
- **Example**: Digestive system, circulatory system etc.



(7) Individual or Organism Level

- **Definition**: Different organs and organ systems are organized together to form an individual or organism.
- **Example**: Human

- **Species** is a group of closely related organisms very similar to each other and are usually capable of interbreeding and producing fertile offspring.
- **Habitat** is the natural environment in which an organism lives, or the physical environment that surrounds a species population.

(8) Population level

- A population is defined as a group of organisms of the same species located at the same place, in the same time.
- Example. Pakistan comprises of 204.73 million individuals.

(9) Community level

(a) Introduction

A community is an assemblage of different populations interacting with one another within the same environment.

(b) Example

- A forest may be considered as a community. It includes different plants, microorganisms, fungi and animal species.
- Communities are collections of organisms, in which one population may increases and others may decrease.
- Some communities are complex e.g. forest and pond community.
- Some communities are simple e.g. a fallen log with various populations under it.
- Simple communities have limited number and size and any change in biotic or abiotic factors may have drastic and long lasting effects.

(10) **Biosphere level**

The part of the earth inhabited by organisms' communities is known as biosphere.It constitutes all ecosystems(areas where living organisms interact with the nonliving components of the environment) and also called the zone of life on earth.

Activity- 01

Give short answers of the following.

i. How would you differentiate the biomolecules from other molecules?

ii. Define a species.

iii. Explain the term habitat.

iv. Differentiate between ecosystem and biosphere.

v. Identify any four systems in human.

Activity-02

- **Fill in the blanks.**

- Group of similar cells is called----------.
- Different organs combine each other to form a---------- level.
- Liver and pancreas are examples of---------- .
- Area in which organism lives is called----------.
- A group of organisms capable of interbreeding and producing fertile offspring is called----------.

Activity-03
- Chose the correct option

1- Which one will be the correct sequence of the levels of organization of life?

(a) Cell, organelle, molecule, organ, tissue, organ system, individual

(b) Molecule, tissue, organelle, cell, organ system, organ, individual

(c) Molecule, organelle, cell, tissue, organ, organ system, individual

(d) Organ system, organ, tissue, cell, molecule, organelle, individual

2- Which of these major bioelements is the highest percentage in protoplasm?

(a) Carbon (b) Hydrogen

(c) Oxygen (d) Nitrogen

Activity- 04

1- Which of these tissues also makes the glandular tissue in animals?

(a)Epithelial tissue (b)Muscular tissue

(c)Connective tissue (d)Nervous tissue

2- The level of organization that is less definite in plants is:

(a) Tissue level (b) Organ level

(c) Organ system level

(d) Individual level

Closure

- **Fill in the blanks**.

  - We have done today the topic----------

  - There are total ----------elements that occur in nature out of which ------- are called bio elements.

  - Tissues organize together to make a unit called--------.

  - Different organs and organ systems are organized together to form ----------

  - A community is an assemblage of different----------

Home work

- Write the answers to three short and two detailed questions from the topic with the help of text book or notes available on school web site.

- Draw a linkage chart connecting different organs with the relative organ systems with the help of internet searching.

References for helping materials

- Biology grade. 9 published by
  PLD publishers, Lahore.

- WWW.PAKISTANSCHOOL.ORG/FIRSTERM
  for biology notes grade 9th.

- Top study world biology class 9th.