Ministry of Education

STEMIUM website

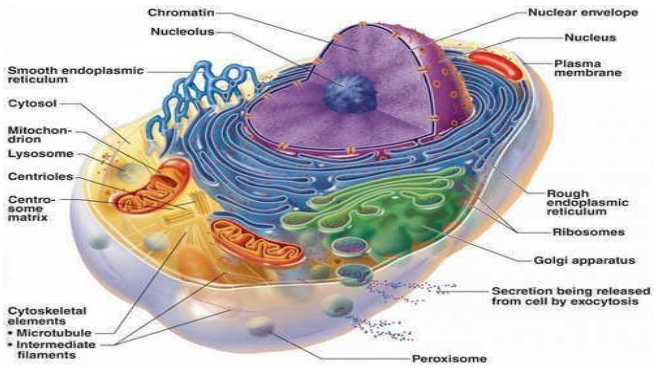
(Biology Notebook)

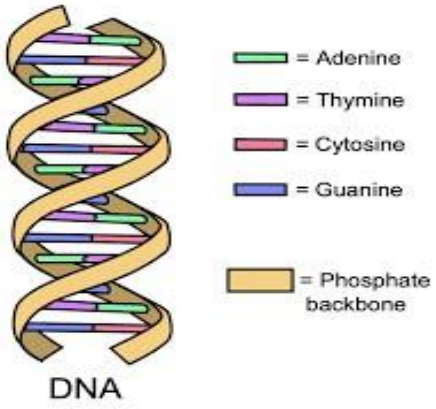
1st Secondary Grade

First Term

STUDENT NAME : .....

Class : .....





First Session Date : ..... / ..... / 2022 Second Session Date : ..... / ..... / 2022

Unit One (Lesson (1) Chemical structure of living organisms &Carbohydrates)

Living organisms' bodies consist of:
Systems Organs Tissues Cells Cellular organelles

Cells of living organisms consist of **organic molecules** and **inorganic molecules.**

Organic molecules as carbohydrates, lipids, proteins, and nucleic acids. They are big molecules containing hydrogen and carbon basically known as "**Biological macromolecules"**

Inorganic molecules as water and salts, which may contain carbon or not.

Biological macromolecules:

They are large biological molecules (P**olymers)** composed of smaller molecules called "**monomers".** Monomers bind together by a process called **"polymerization process"**

Carbohydrates

Their general formula is $(CH_2O)_n$ (**In at a ratio 1:2:1 respectively) Importance of carbohydrates:-**

1- The main and quickest source of energy in living organisms

2- Store energy in living organisms, (plants store carbohydrates as **starch**, whereas animals and humans store them as **Glycogen** in liver and muscles

3- The basic component of some parts of cell such as **cellulose** in the cell walls of plant cells.

The molecular structure of carbohydrates

Carbohydrates are divided according to their structures into:-

I. Simple sugars:-

Common properties of simple sugars:-

1- Soluble in water

2- They have small molecular weights 3- They have a sweet taste **A. Monosaccharides:**

Examples:

1- Glucose (Grapes sugar) 2- Fructose (Fruits sugar) 3- Ribose

B. Disaccharides:

Structure: Two molecules of monosaccharides bound together

Examples:-

1- Sucrose (sugar cane): It consists of glucose molecule bound with fructose one

2- Lactose (milk sugar): It consists of glucose molecule bound with galactose one

3- Maltose (malt sugar): It consists of two bound glucose molecules

glucose

Monosaccharides role in energy transfer processes inside living organisms:- Living organisms release the energy stored in monosaccharides as the following:-

1- Glucose is oxidized inside **mitochondria** in cells

2- The energy stored in glucose gets released in the form of chemical bonds

3- These chemical bonds are stored in compounds called **Adenosine Triphosphate (ATP)**

4- ATP transports to all parts of cell using its stored energy in all biological processes in cell

How to detect simple sugars in food

 We can detect simple sugars in food by using **Benedict reagent,** simple sugars change the colour of this reagent from **blue** to **orange**.

II. Complex sugars:-

Common properties of simple sugars:-

1- Insoluble in water 2- They have heavy molecular weights

3- They don't have any taste

Examples:- 1- Cellulose 2- Starch 3- Glycogen **How to detect starch in substances:**

Starch changes the colour of **iodine solution** to **blue**

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Choose the correct answer :

1- The molecules which don't contain carbon atoms are …….molecules.

a) Carbohydrates b) lipid c) water d) protein

2- Which of the following is not an organic biological molecule?
a) Nucleic acid b) carbohydrates c) water d) protein

3- The general formula $(CH_2O)_n$ indicates ……
a) Fats b) proteins c) cholesterol d) carbohydrates

4- The sugars which is known as malt sugar is ……..
a) Maltose b) sucrose c) lactose d) galactose

5- All the following carbohydrates are soluble in water except ……
a) Glycogen b) sucrose c) glucose d) fructose

6- When two molecules of glucose are combined together…….is formed.
a) Lactose b) maltose c) ribose d) sucrose

7- From the example of disaccharides is the …….
a) Glucose b) fructose c) galactose d) sucrose

8- Which of the following is not a polysaccharide?
a) Starch b) glycogen c) cellulose d) sucrose

9- The sugars that are responsible for energy production process inside the cells of living organisms are …….
a) Monosaccharides b) disaccharides c) complex sugar d) simple sugar

10- From the example of polysaccharides is …….
a) Cellulose b) sucrose c) maltose d) lactose

11- Glycogen consists of…….. molecules.
a) Fructose b) glucose c) galactose d) ribose

12- Benedict's reagent is used for detecting ……..
a) Glucose b) sucrose c) starch d) cellulose

13- Iodine solution is used for detecting …….
a) Glucose b) sucrose c) starch d) Cellulose

14- Carbohydrates are stored in the cells in the form of ……..
a) Cellulose b) glycogen c) starch d) glucose