First year of secondary school

# Chemical composition of living organisms (carbohydrates)

Teaching plan for the first lesson

# Biology

| Skills | Linking materials | Type of activity | The course of the lesson | number Quotas | Axes of the educational component | Objectives | The educational compone |
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| Interpretive.<br><br>Application. | | | **Activate prior knowledge**<br>ÿ<br>Transform their knowledge about the molecules of substances that make up most of the bodies of living organisms, then explain to them that they consist of organic compounds and inorganic compounds. • Ask the student a question<br><br>**Correcting the misconception:** Some students may think that all chemical compounds containing carbon are organic substances. Therefore, it must be emphasized that some of these compounds, such as alcohols and some salts, are inorganic substances.<br><br>the explanation<br>•The students knew that polymers are large biological molecules that are formed from the linking of smaller molecules called monomers through the polymerization process. Through this, ask them to research how the polymerization process occurs.<br><br>Explain to the students that carbohydrates are organic compounds whose molecules consist of carbon, hydrogen, and oxygen atoms. | Commentary: 1<br><br>Work: 1<br><br>Total: 2 | •ÿÿÿÿÿÿÿÿÿÿÿÿ<br>•ÿÿÿÿÿÿÿÿÿÿ<br>•ÿÿÿÿÿÿÿÿÿÿ<br>•ÿÿÿÿÿÿÿÿ<br>•Monosaccharides<br>•Disaccharides<br>•Complex polysaccharides | At the end of this synthesis lesson the student should be able to: Organisms (carbohydrates)<br>ÿ<br>•Identifies the materials that make up the organism's body.<br>•Describes the molecular structure of carbohydrates.<br>• Explains the role of monosaccharides in energy transfer processes within the cells of living organisms. | |

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| | | | • Explain to the students the importance of carbohydrates for living organisms, as they are the source of energy needed to carry out all vital processes, and a source of carbon in the process of building cellular components. | | | | |
| Observation and conclusion | | an individual | Show the students pictures of some foods rich in carbohydrates, and ask the following question:<br>- What is the source of sugar, starch and cellulose in these foods? (Plants derive energy from sunlight to make sugar, starch, and cellulose through the process of photosynthesis.) | | | | |
| Interpretive. | | an individual | Point out to the students that plants are the source of carbohydrates on Earth, and ask the students the following question:<br>What are the forms of storing carbohydrates in plants and humans?<br>Through their answers, explain to them that carbohydrates are stored in plants in the form of starch, and in humans and animals in the form of glycogen in the liver and muscles until the body needs them and reuses them again. | | | | |

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| | | | • Explain to the students that carbohydrates can be classified according to the number of sugar units they contain, that is, according to (the molecular structure of carbohydrates). Then explain to them that the structure of carbohydrates contains carbon, hydrogen, and oxygen, which are divided in a ratio of 1:2:1, respectively. | | | | |
| Interpretive and application | | | sugars are divided into two groups: - Simple sugars: (monosaccharides and disaccharides) - Complex sugars: (composed of repeating monomers of monosaccharides, which result from the polymerization process.) Give examples. | •The student knew that | | | |
| Interpretive. | | | • Discuss with the students how the composition of the three sugars differs from each other, then explain to them that monosaccharides consist of simple-structured sugar molecules, examples of which are (glucose and fructose), while disaccharides are formed as a result of the connection of two simple sugar molecules, examples of which are (sucrose and maltose). Complex sugar molecules are formed as a result of the linking of thousands of simple sugar from molecules, examples of which are (cellulose and starch). | | | | |
| Interpretive. | | | Explain to the students the characteristics of simple and complex sugars in terms of solubility, molecular weight, and taste. | | | | |

•The student knew that the body's energy reserve is in the form of adenosine triphosphate (ATP), and when the body needs energy, it oxidizes carbohydrates (such as glucose) inside the mitochondria and then the energy is released to where it is needed.

Data collection and analysis.

an individual

Delete some data, then ask each student to fill in the remaining data.

Draw on the board the following table with the

| His presence | Type of sugar | Sugar name |
|---|---|---|
| Grapes | Single sugar | Glucose |
| the fruit | Single sugar | fructose |
| One of the components of lactose in milk | Single sugar | galactose |
| cane sugar | A disaccharide | Sucrose |
| Milk sugar | A disaccharide | Lactose |
| Capillary sugar | A disaccharide | Maltose |
| Rice, corn, potatoes | A disaccharide with a complex structure | Intoxication |
| Structure of the cell wall of plant cells and at night | Complex sugar | Cellulose |
| Liver and muscles | Complex sugar | Glycogen |

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| **Practical work and conclusion.** | | **Famine** | **Activity: (Detecting sugar)**<br>**- Tools:**<br>**- Test tubes -Stove - Water lawyer**<br>**- Glucose solutions - Starch solutions - Egg albumen**<br>**- Distilled water - Benedict's blue reagent**<br>**- Mixes:**<br>**Divide the class into four groups and ask them to:**<br>**1- Pipe numbering from 1:4**<br>**2- Place 2 ml of the following materials in order in each of the four tubes:**<br>**- Starch solution - Glucose solution**<br>**- Distilled water - Egg whites**<br>**3- Add 2 ml of Benedict's reagent to each tube.**<br>**4- Place the pipes in a water heater and leave them for 5 minutes, then turn off the stove.**<br>**5- Ask the students to observe the results.** | | | | |

- Observation and interpretation:

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| )1( | Tube number |
| Glucose solution | Subject |
| The detector color changes to orange. | Note |
| Because glucose is a monosaccharide that changes the color of Benedict's reagent from blue to orange. | Interpretation |
| )2( | Tube number |
| Starch solution | Subject |
| The color of the detector does not change. | Note |
| Starch is a complex sugar that did not change the color of Benedict's reagent. | Interpretation |
| )3( | Tube number |
| Egg albumen | Subject |
| The color of the detector does not change. | Note |
| Egg albumen does not contain monosaccharides. | |
| )4( | Explanation Tube number |
| Distilled water | Subject |
| The color of the detector does not change. | Note |
| Distilled water does not contain monosaccharides. | Interpretation |

- Conclusion:

- Explain to the student that Benedict's reagent is used to detect monosaccharides in different foods.

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| Practical work and conclusion. | | Famine | •Activity: (detecting starch).<br>- Tools:<br>- Wheat - Hamalol iodine - sugar<br>- Pasta - Bread - Test tubes<br>- Mixes:<br>• Ask the students to carry out the same previous steps in detecting sugar to detect starch, except for the heating step and recording their observations and the results they reached, taking into account grinding some materials that need this, such as pasta.<br>- Observation and interpretation:<br>•For foods that need starch, the color of the reagent changes from orange to dark blue. As for foods in which the color of the reagent does not change, this is evidence that they do not contain starch.<br>- Conclusion:<br>• Explain to the students that starch solution is used to detect starch in different foods. | | | | |

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| Data collection and analysis. | | an individual | **Evaluation**<br>To assess students' understanding, ask them the following questions:<br>- What is the importance of carbohydrates for living organisms?<br>- What are carbohydrate molecules made of?<br>- Make sure that students use the skill of written expression: Ask them to write an article Explain why athletes eat foods rich in carbohydrates before participating in matches?<br>- Ask the students to compare monosaccharides, disaccharides, and complex sugars.<br>- Help the student to conclude: How do we benefit from both simple sugars and complex sugars in our lives? Giving examples. )Example Glucose in: a sugar transported Metabolism inside And it comes into my work Blood<br>- Ask the students to do the exercises in the educational element (Chemical composition of the bodies of living organisms (carbohydrates)). | | | | |