

Biological Molecules, Biology Grade 9-12

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Lesson Plan Summary:

In this lesson, students will learn about the structures and functions of different types of biomolecules such as carbohydrates, lipids, proteins and nucleic acids by examining and identifying their presences in traditional Mexican foods.

Objectives:

- Students will compare the structures and functions of different types of biomolecules such as carbohydrates, lipids, proteins, and nucleic acids **TEKS §112.43. Biology.(9)(A)**
- Students will compare the energy flow in photosynthesis to the energy flow in cellular respiration **TEKS §112.43. Biology (9)(B)**
- Students will investigate and identify the effects of enzymes on food molecules **TEKS §112.43. Biology (9)(C)**

Vocabulary:

Food, energy, metabolism, metabolic pathway, carbohydrate, lipid, protein, nucleic acid, enzymes, photosynthesis, aerobic respiration, anaerobic respiration, electron's chain.

Procedures:

1. Begin the lesson by asking the students what they had for breakfast. Ask them to name examples of carbohydrates, proteins and lipids and write these examples on the board.
2. Define each biological molecule, showing the main structures and giving the students common examples.
3. Compare the examples of these molecules found in the textbook with the examples listed by students. If there are any mistakes, use this time for corrections and explanations.
4. State that food is the source of energy and compare the energy provided from lipids, carbohydrates and proteins.
5. Mention the enzymes implicated during the food breakdown.

Activity 1

Students will examine the following images of traditional Mexican foods, found on the TIDES site, and classify the foods as carbohydrates, proteins or lipids:

1. Tortillas: <http://tides.sfasu.edu:2006/u/?Digital,258>
2. Bread: <http://tides.sfasu.edu:2006/u/?Digital,1491>
3. Breakfast: <http://tides.sfasu.edu:2006/u/?Digital,747>
4. Cabrito: <http://tides.sfasu.edu:2006/u/?Digital,380>

Activity 2

Students will analyze nutrition facts and ingredients from various foods.

1. Ask the students to bring to school 3 different empty packets of foods such as cereal, chips, cookies or bread.
2. Analyze the labels containing nutrition facts and ingredients.
3. Using the ingredients list, students will identify examples of carbohydrates (ex. wheat), lipids (ex. Vegetable oil) and proteins (ex. egg, milk).

Assessment:

Draw the respiration stages. Include the following concepts:

- ATP, NADH, FADH, Electron transport chain, Mitochondrion, Cytoplasm, Fermentation, Glycolysis, Glucose, Pyruvate, Lactic acid, Krebs's Cycle.

Draw the photosynthesis stages. Include the following concepts:

- Light dependent reactions, Energy, Sunlight, Water, Hydrogen ions, Electrons, Oxygen, Light, Chemical Energy, ATP, NADPH, calvin cycle, Glucose, Carbon Dioxide, photosystem I, photosystem II, Cytocrome, Thylakoid lumen, tylacoid membrane, calvin cycle.

Analyze the chemical energy produced in ATP in each of the metabolic pathways.