Name: _____**Class:** _____ **Date:** _____

Testing For Organic Molecules

Learner Outcomes:

- Describe, in general terms, the forms of organic matter synthesized by plants and animals, including carbohydrates, lipids and proteins.

Key Terms:

Organic compound	Carbohydrates	Micronutrients
Inorganic compound	Lipids	Macronutrients
Proteins	Nutrients	

Background Information: Organic molecules are the chemicals of life, compounds composed of more than one type of element that are found in, and produced by, living organisms. The feature that distinguishes an organic from inorganic molecule is that organic contain carbon-hydrogen bonds, whereas inorganic molecules do not. The four major classes of organic molecules include carbohydrates, proteins, lipids and nucleic acids. The presence of three of these types of molecules, carbohydrates, proteins and lipids, can be tested using specific indicators.

http://suite101.com/article/what-are-organic-molecules-a33417#ixzz1wC6lRkJx

Reference Chart for Indicators Used to Test for Organic Molecules

Substance	Positive Test
Glucose	Benedict's solution turns from blue to yellow-orange-red.
Starch	Iodine solution turns from red-brown to blue-black.
Fat/Oil	Fats and Oils leave a spot on brown paper that light can pass through.
Protein	Biuret solution turns from blue to purple or mauve.

Problem: How are indicators used to test for the presence of different types of organic molecules?

This investigation / activity has been adapted from:
Mah K, Martha J, McClelland L, et al. *Science in Action 9.* Toronto, ON: Addison Wesley.

Materials:

Water	Vegetable oil	Medicine droppers
Benedict's solution	Potato piece	Small test tubes
Biuret solution	Gelatin / albumin	Hot water bath
Iodine	Sucrose	Stir sticks
Glucose	Spot plate	Unknown samples A and B
Corn starch	Brown paper	

CAUTION: Benedict's solution, Biuret solution and iodine solution are hazardous, corrosive substances that can stain your clothes and skin. Handle them carefully.

Procedure:

1. Label your plastic sample cups and collect 10ml/small sample of each substance.

Testing for Glucose:

1. Label each test tube by placing the label piece of tape around the top of the test tube.
2. Place a small amount of each substance in separate test tubes
3. For the solid samples, place a small amount of water in each test tube
4. Add 10 drops of Benedict's solution to each test tube. Make sure that the Benedict's solution mixes with your sample.
5. Add hot water to your beaker and heat tubes for at least 3 minutes. Record your observations.

Testing for Lipids:

1. Divide a piece of brown paper into 7 sections. Label each section with the name of the substance to be tested on it: one section for water, one for potato, etc. Place a drop of each substance on the appropriate spot on the brown paper or rub the sample piece on the paper.
2. Leave the paper for 5-10 minutes in a horizontal position. After the time is up, look through the paper by holding it up to the light.

Testing for Starch:

1. Place several drops/small sample of each substance to be tested into separate places on a spot plate.
2. Place a drop of iodine solution on each substance. Record your observations.

Testing for Proteins:

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1. Place several drops/ small sample of each substance into separate places on a clean spot plate.
2. Add three drops of Biuret solution to each of them. Make sure that the Biuret solution mixes with your sample. Record your observations.

Observations:

	Final Colours Using Indicators			Light Transmission Through Brown Paper (Lipid Test)
Substance Tested	Benedict's Solution (Glucose Test)	Iodine Solution (Starch Test)	Biuret Solution (Protein Test)	
Water				
Sweetened Water				
Potato Piece				
Vegetable Oil				
Albumin (Egg)				
Unknown A				
Unknown B				

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Analysis:
Analyze your data and use the reference table above to determine what organic molecules were present in your substance, <u>support</u> your answer with your results.

Identifying Organic Molecules Present In Each Sample	
Water	
Sweetened Water	
Potato Piece	
Vegetable Oil	
Albumin (Egg)	
Unknown A	
Unknown B	

Conclusion: Describe how you determined which nutrients were in your unknown samples.

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Extension:

Find out whether the following substances are organic or inorganic. Identify the common source of each. Organize your information into a table.

- Gasoline
- Nitrogen gas
- Canola oil
- Vinyl
- Hydrogen sulfide
- Gypsum
- DNA
- Plant Fertilizer (PNK)
- Rubber
- Glass
- Fat
- Motor oil
- Vitamin C
- Rust

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