Name_____Per___

LAB: Macromolecule Testing

INTRODUCTION:
One characteristic of life is that living things are made up of molecules containing carbon. These are called **ORGANIC MOLECULES**. In our class we have been referring to them as macromolecules since they are necessary for life. The most common organic compounds found in living organisms are **LIPIDS**, **CARBOHYDRATES**, **PROTEINS**, and **NUCLEIC ACIDS**. Common foods, which often consist of plant materials or substances derived from animals, are also combinations of these organic compounds. Simple chemical tests with substances called **indicators** can be conducted to determine the presence of organic compounds. ***A color change of an indicator is usually a positive test for the presence of an organic compound.***

PURPOSE:
To use indicators to test for the presence of lipids, carbohydrates, and proteins in various foods.

HYPOTHESIS: Which foods will contain which macromolecules? Check the box below each macromolecule you think each food contains.

Food	Lipids	Carbohydrates	Proteins
Water			
Oil			
Milk			
Oatmeal			
Apple Juice			

MATERIALS:
Indicators (Biuret reagent, Benedict's solution, Lugol's solution)
Food in bottles, 10 test tubes, beaker, hot plate, test tube holder, brown paper towel, 2 well plates.

PROCEDURE:

LIPIDS (1 test)

TEST 1: Testing for Lipids: Part I

1. Tear off a piece of paper towel 30 cm long and put the names of your group members in the upper right hand corner.
2. Draw 6 small squares, approximately 3 cm each, and label each with the name of 1 of the foods (water, oil, milk, oatmeal, apple juice, and Unknown X).
3. Put 1 drop of each of the foods in the corresponding boxes on the paper towel.
4. Put the paper towel aside while you do the other 4 tests.
5. When the paper towel is dry, record your observations in the data table below. Look for a grease stain.

CARBOHYDRATES (2 tests)

TEST 2: Testing for Starches

1. Fill 6 wells in your well plate: water, oil, milk, oatmeal, apple juice, and Unknown X. (see diagram on page 3)
2. Add 10 drops of **Iodine Solution** to each well.
3. Check for any color change and record data in table.
4. Clean and dry well plate

TEST 3: Testing for Sugars

1. Put 1 dropper full of each food (water, oil, milk, oatmeal, apple juice, and Unknown X) in 6 different test tubes. Make sure to LABEL all test tubes.
2. Add 10 drops of **Benedict's Solution** to each test tube and place them all CAREFULLY into the hot water bath for 3-5 minutes.
3. Remove test tubes from hot water bath using designated tongs and place them into test tube holders. Note the color change and record into the table.
4. Wash all test tubes and place in test tube racks upside-down to dry.

PROTEINS (1 test)

TEST 4: Testing for Proteins

1. Fill 6 wells in your well plate: water, oil, milk, oatmeal, apple juice, and Unknown X. (see diagram on page 3)
2. Add 10 drops of **Biuret's Solution** to each well.
3. Check for any color change and record data in table.
4. Clean and dry well plate

Diagram: 6 wells filled with the various substances.

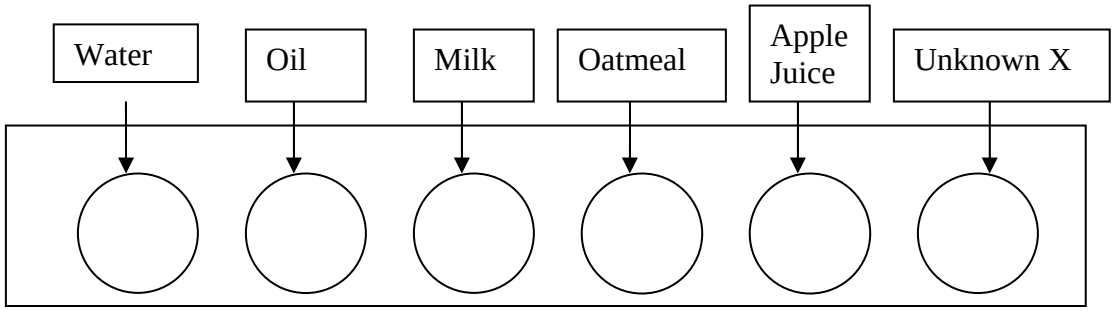

Table 1: Results from the testing of 4 solutions for organic compounds (carbohydrates, lipids, and proteins).

	Lipid Tests (1 test)		**Carbohydrate Tests (2 tests)**				**Protein Test (1)**	
Substance	Spot or No spot	Lipid present (+)	Benedict Color	Sugar present (+)	Lugol Color	Starch present (+)	Biuret Color	Protein present (+)
Water								
Oil								
Milk								
Oatmeal								
Apple Juice								
Unknown X								

Results:

1) Which test substances contained LIPIDS?_____

2) Which test substances contained STARCH?_____

3) Which test substances contained SUGAR?_____

4) Which test substances contained PROTEIN?_____

5) Which test substances did not test positive for ANY organic compounds?_____

POST LAB QUESTIONS – Macromolecules Testing

1) Which macromolecules (or types of macromolecules) did you test for in this lab?

2) How did your hypothesis compare with your results?

3) Describe anything that might have affected your results (sources of error).