Name: _____ Date: _____ Period: _____

Identifying Organic Compounds Food Lab

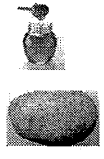
Introduction: The most common organic compounds found in living organisms are lipids, carbohydrates, proteins, and nucleic acids. Common foods, which often consist of plant materials or substances derived from animals, are also combinations of these organic compounds. Substances called indicators can be used to test for the presence of organic compounds. An indicator is a substance that changes color in the presence of particular compounds. In this investigation, you will use several indicators to test for the presence of sugars, lipids, carbohydrates, and proteins in various foods.

Problem: What are the major types of organic compounds in some common foods?

Objectives:

1. List the 4 types of macromolecules.
2. Explain the functions of the 4 major macromolecules.
3. Identify the monomers of the 4 major macromolecules.
4. Explain how the 4 major macromolecules are formed.
5. Explain how enzymes work.
6. Identify what factors influence an enzyme's effectiveness.

Hypotheses: Please make hypotheses on data chart.



<u>Sugar Test – Teacher Demo</u>

1. Fill each test tube with 5 ml of the food indicated on labeled test tubes.
2. Add 10 drops of Benedict's solution to each test tube.
3. Heat the test tubes in a hot water bath for 3-5 minutes.
4. <u>If the food turns orange, it is positive for sugar.</u>
5. Record Results

<u>Lipid Test</u>

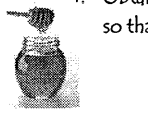
1. Obtain a piece of paper towel. Using a pen or pencil draw a labeled grid on the paper towel as shown below.

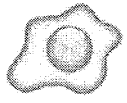
Honey	Egg White	Corn Oil	Lettuce	Gelatin
Butter	Potato	Apple Juice	Water	Mayonnaise

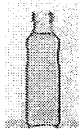
2. Add one drop of each food to the paper towel in the appropriate box. Allow the paper to dry (at the end of Day 1).
3. Hold the paper up to the light. <u>If the paper is translucent, the food is positive for lipids.</u> Record results

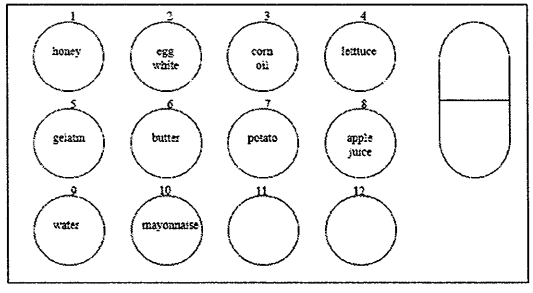
<u>Starch Test</u>

1. Obtain a white tray. Add two drops of each food into the given wells. Follow the diagram below so that you will remember which foods are in which wells.





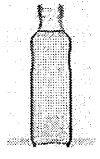




2. Add two drops of iodine to each food. Stir with a toothpick if necessary.
3. <u>If the food turns a very dark color (nearly black), it is positive for starch.</u>
4. Record results
5. Clean out the tray for the next activity.

<u>Protein Test</u>

1. Repeat step one of the starch test.
2. Add two drops of biuret reagent to each food. Stir with a toothpick if necessary.
3. <u>If the food turns violet, it is positive for protein.</u>
4. Record results
5. Clean out the tray.



<u>Conclusion:</u>

1. Which foods contain fat?

2. Which foods contain sugar?

3. Which foods contain starch?

4. Which foods contain protein?

5. Sugar is not one of the major organic compound groups, yet we tested for it in the foods. Why do you think we tested for sugar? How is it related to organic compounds?

Sugar

Food	Hypothesis	Benedict Color	Sugar (+)
Honey			
Egg White			
Corn Oil			
Lettuce			
Gelatin			
Butter			
Potato			
Apple Juice			
Water			
Mayo			

Starch

Food	Hypothesis	Iodine Color	Starch (+)
Honey			
Egg White			
Corn Oil			
Lettuce			
Gelatin			
Butter			
Potato			
Apple Juice			
Water			
Mayo			

Lipid

Food	Hypothesis	Translucent	Lipid (+)
Honey			
Egg White			
Corn Oil			
Lettuce			
Gelatin			
Butter			
Potato			
Apple Juice			
Water			
Mayo			

Protein

Food	Hypothesis	Biuret Color	Protein (+)
Honey			
Egg White			
Corn Oil			
Lettuce			
Gelatin			
Butter			
Potato			
Apple Juice			
Water			
Mayo			

Analysis and Discussion:

1. Which test substance did not test positive for any of the organic compounds? _____
2. People with diabetes are instructed to avoid foods that are rich in carbohydrates. How could your observations in this investigation help you decide whether a food should be served to a person with diabetes?

3. Your fast food bag has large, translucent spot on the bottom. What explanation could you give for this occurrence?

4. Use the following chart of the 20 amino acids to answer the questions 1-2. Remember amino acids are used to build proteins.

Alanine	Arginine	Asparagine	Aspartic Acid	Cysteine
Glutamic Acid	Glutamine	Glycine	Histidine	Isoleucine
Leucine	Lysine	Methionine	Phenylalanine	Proline
Serine	Threonine	Tryptophan	Tyrosine	Valine

A. Using the chart build a protein that is 5 amino acids long. All proteins start with the amino acid methionine.

1.	2.	3.	4.	5.

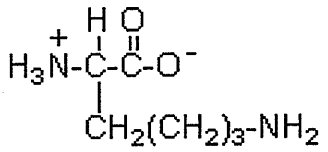
B. Using the chart build a protein that is 10 amino acids long. Please use different amino acids than you used in question number 1. All proteins start with the amino acid methionine.

1.	2.	3.	4.	5.
6.	7.	8.	9.	10.

C. Complete the table comparing the 2 proteins you built in A and B.

	Protein A	Protein B
Similarities		
Differences		

Protein 1



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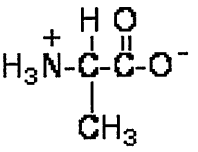

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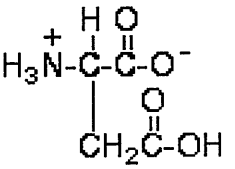

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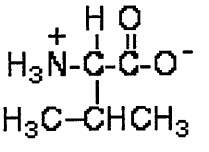

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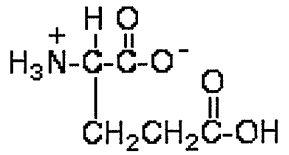
Protein 2



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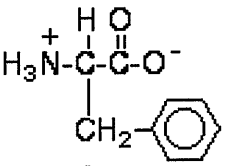

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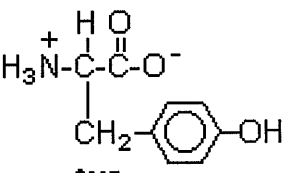

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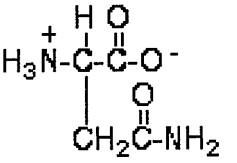

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Refer to the 2 pictures above to complete the chart below comparing the differences between these two proteins. Assume that each protein begins with the amino acid methionine.

	Protein A	Protein B
Similarities		
Differences		

5. Draw a monosaccharide. (Use your book or notes. Chapter 2 Section 3).

6. Draw a polysaccharide.

7. Complete the chart comparing monosaccharides to polysaccharides.

	Monosaccharides	Polysaccharides
Similarities		
Differences		