LAB #_____ Nutrients

Lab Instructor_____ Name_____
Date _____ Period_____

Objective: To test foods for the presence of nutrients

******Use full sentences when answering all questions.******

Background

Carbohydrates, fats, and proteins provide energy and materials for growth. Proteins also regulate the activities of the cell, as do vitamins and minerals. Water dissolves materials in the cell and encourages chemical reactions to occur. The best way to get all the essential nutrients is to eat a balanced diet. A balanced food plan includes nutrients from each of the five food groups.

In this lab you will perform some of the chemical tests that are used to identify the presence of nutrients in our food.

Pre-Lab

Read the entire lab description and appropriate text pages to answer the following questions.

1. Define the term nutrient.

2. Describe the structure of the following molecules. You may use drawings to clarify.
   a. starch

   b. protein.

   c. lipid

3. How could you prove that orange juice contains vitamin C?

4. Considering that other students will be using the same equipment after you, why is it important to thoroughly wash your test tubes after today's lab?

LAB

Materials

known and unknown food samples, rack of test tubes, test tube holder, test tube brush, goggles, unglazed paper, separate bottles of: Lugol's solution, Benedict's solution, Biuret solution, and indophenol

Procedures and Observations

I. Standard Nutrient Tests

Perform the following procedures and record observations in Table 1. In the column labeled "Positive Test," describe what you observe when each nutrient is combined with its indicator.

A. ***Starch.*** Place ½ inch of starch solution in a test tube; add 2 drops of Lugol's solution.
B. ***Sugar.*** Place ½ inch of sugar solution in a test tube; add 10 drops of Benedict's solution; heat in a hot water bath for five minutes.
C. ***Protein.*** Place ½ inch of albumin (egg white) mixture in a test tube; add 10 drops of Biuret solution.
D. ***Lipid.*** Place 1 drop of oil on a piece of brown unglazed paper; wait 2 minutes; hold up to the light.
E. ***Vitamin C.*** Place 10 drops of indophenol into a test tube; add drop by drop the food sample containing ascorbic acid (vitamin C) to the indophenol; shake the test tube after each drop; count the number of drops required to bleach the indophenol.

Name_____

Period_____

NUTRIENT	INDICATOR USED	INDICATOR APPEARANCE WITHOUT NUTRIENT	POSITIVE TEST OBSERVAIONS
STARCH			
SIMPLE SUGAR			
PROTEIN			
LIPID (FAT)			
VITAMIN C			

TABLE 1. Standard nutrient tests

II. Experimental Nutrient Tests

Perform the following procedures and record observations in Table 2 and 3.

A. Place a small amount of the food sample in a separate, clean test tube; add 5 drops of water to each test tube.
B. Perform the nutrient tests for starch, sugar, protein, lipid and vitamin C as described earlier. Write the word POSITIVE if the results indicate the presence of the nutrient and write NEGATIVE if the nutrient was absent.

FOOD SAMPLE	STARCH	SUGAR	PROTEIN	LIPID	VITAMIN C

TABLE 2. Data for unknown food samples

FOOD SAMPLE	STARCH	SUGAR	PROTEIN	LIPID	VITAMIN C

TABLE 3. Data for known food samples

Conclusions

1. How are nutrient indicators useful to dieticians?

2. Compare the structure of a starch to that of a sugar.

3. Describe your observations if you were to add Benedict's solution to a potato. (Hint: Does a potato taste sweet?)

4. Fill in the missing word(s): The greater the concentration of ascorbic acid (Vitamin C), the _____ the number of drops needed to bleach the indophenol.
5. Why is it a good technique to have a second test tube containing only iodine when performing the starch test?

6. Why are the nutrients found in today's lab classified as organic molecules? Identify three *inorganic* nutrients.