**Macromolecule Food Lab**



**Background:** all organic compounds contain the element carbon. Chemically, carbon is unique because of its ability to form covalent bonds with other atoms, and its tendency to link with other carbon atoms into rings or long chains. Living things depend on the energy stored in the bonds of large, organic macromlecules such as lipids, carbohydrates (sugars and starches), and proteins. These macromolecules are made in the bodies of plants and animals and are used for food energy when eaten by another animal. As an animal digests food, the energy of the covalent bonds of these food molecules is released. Simple indicator tests can identify the presence of these molecules.

**Purpose:** what molecules are found in common foods?

**Predictions:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Sugar | Starch | Protein | Lipids |
| Marshmallow |  |  |  |  |
| Potato chips |  |  |  |  |
| Apple |  |  |  |  |
| Cheese |  |  |  |  |

# Tests

**Iodine** – add two to three drops to the food solution.

* Changes from yellow to black in the presence of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Biuret’s solution** – add one to two drops to the food solution.

* Changes from yellow-blue to purple in the presence of \_\_\_\_\_\_\_\_\_\_\_\_.

**Benedict’s solution** – add one eye dropper full to the food solution in a test tube. Boil for five minutes.

* Changes from blue-green to a yellow-orange in the presence of .

**Paper test** – put one drop of food solution on the paper and dry it with a paper towel.

* If the spot remains, then lipids are present.

**Procedures: test of unknowns**

 1. Test any 3 of the different foods for all 4 biological molecules.

1. To do this, use a spot plate or a test tube as indicated to test each food solution for each macromolecule.
2. Record data in a data table in your lab notebook.

Key

 3 = very strong / positive test

 2 = strong / positive test

 1 = weak / positive test

 0 = no color change in indicator/negative

 4. For test results use the following system:

**Discussion questions (answer the questions in complete sentences):**

1. Describe, step by step, how you'd test a hard-boiled egg yolk for sugar, starch, protein, and fat.
2. Give a definition for the term "indicator".
3. List the 3 indicators used in this experiment and tell specifically what they are used for.
4. Fats store the most energy in their bonds. Organisms in cold environments eat and store fat in their bodies for extra food and insulation. If you were an eskimo and went long periods between meals, what foods would be best to eat and why?
5. Sugars go right to the cells of your body and get burned quickly for energy. Which of the foods you tested would be best for a sprinter to eat just before a race?
6. Get a label off a can of food, and record the amount (in grams) of carbohydrates, protein, and fats. Glue the label in your notebook.

