**Exploring Biological Macromolecules:**

**What’s in your food?**

**30 Points Possible**

**Introduction**

Have you ever heard the phrase, “You are what you eat”? It is true! You and all other living things are composed of carbohydrates, lipids, proteins and nucleic acids, which are the four major groups of biological macromolecules. Now that you know that all living things are made up of biological macromolecules, you should be asking yourself “How do macromolecules get into our bodies to make up who we are?” The answer is quite simple, by eating food! Living things require the consumption of food in order to maintain everyday activities such as moving, thinking, talking, breathing, and even sleeping. Without the consumption of food, life would cease to exist.

Today you will be examining and testing some commonly consumed food items for the presence of one or more of the following biological macromolecules:

* Carbohydrates (sugars)
* Lipids (fats)
* Proteins

**Prelab Questions**

1. List the 4 major groups of biological macromolecules and indicate each of their primary functions.

a.

b.

c.

d.

2. List at least 3 foods that you hypothesize would provide you with a primary source of energy.

a.

b.

c.

3. What is an enzyme? *Explain* how it performs its primary function within living organisms.

**Activity A: Testing for Lipids (Fats)**

**Materials:** brown paper bag

**Procedure:**

1. *Predict* which food samples will contain lipids. (Record your prediction in the data chart below as “+” for yes or “-“ for no)
2. Cut the paper bag so that it lies flat.
3. Draw and label 10 squares respective to the 10 food samples listed in the data collection chart below.
4. Place a sample/ 2-3 drops of each food item (see chart below) onto its respective square on the brown paper bag. *Be sure that you labeled each square as its respective food!!!*
5. Wait 15-20 minutes for the liquid samples to dry (move on to activity B while you wait)
6. Record the data in your chart as “+” if the sample is positive (a grease stain present) or as “–“ if the sample is negative (no grease stain).

**Data collection and analysis:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Food**  **Sample** | **Water** | **Egg** | **Crackers** | **Bread** | **Oil** | **Corn starch** | **Sugar** | **Milk** | **Yogurt** | **Potato** |
| **Prediction** |  |  |  |  |  |  |  |  |  |  |
| **Actual** |  |  |  |  |  |  |  |  |  |  |

**Activity B: Testing for Carbohydrates (Sugars)**

**Materials:** iodine solution, pipette/ medicine dropper, small cups

**Procedure:**

1. *Predict* which food samples will contain carbohydrates.
2. Place a sample of each food (see chart below) into its own small cup. *Be sure to label each cup as the name of its respective food!!!*
3. Place 2-3 drops of iodine into each food sample and indicate any color change in the iodine. Record the data in your chart as “+” if the sample is positive (there was color change) or as “–“ if the sample is negative (no color change in the iodine).

**Data collection and analysis:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Food**  **Sample** | **Water** | **Egg** | **Crackers** | **Bread** | **Oil** | **Corn starch** | **Sugar** | **Milk** | **Yogurt** | **Potato** |
| **Prediction** |  |  |  |  |  |  |  |  |  |  |
| **Actual** |  |  |  |  |  |  |  |  |  |  |

1. What color change did you observe in the food items that tested positive for carbohydrates?

**Activity C: Testing for Proteins**

**Materials:** biuret reagent, small cups

**Procedure:**

1. *Predict* which food samples will contain protein. (Record your prediction in the data chart below as “+” for yes or “-“ for no)
2. Place a sample of each food (see chart below) into its own small cup. *Be sure to label each cup as its respective food!!!*
3. Place 2-3 drops of biuret reagent into each food sample and indicate any color change in the iodine. Record the data in your chart as “+” if the sample is positive (there was color change) or as “–“ if the sample is negative (no color change in the iodine).

**Data collection and analysis:**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Food**  **Sample** | **Water** | **Egg** | **Crackers** | **Bread** | **Oil** | **Corn starch** | **Sugar** | **Milk** | **Yogurt** | **Potato** |
| **Prediction** |  |  |  |  |  |  |  |  |  |  |
| **Actual** |  |  |  |  |  |  |  |  |  |  |

1. What color change did you observe in the food items that tested positive for carbohydrates?

**Post-Lab**

1. Explain why water (H2O) is an acceptable controlled sample to use in each activity of this experiment?

2. Which macromolecule group was not tested during this experiment?

**Conclusion (20 points possible each)**

Each group member is to *individually* write a lab report that summarizes your predictions and how they were either supported or not supported by each data table.

Once completed, each group member needs to staple their summary to this sheet and turn it all in at the white period basket.