Identifying Biomolecules in Food – Pre Lab

Background:
Cells are composed of organic compounds called biomolecules. These biomolecules include carbohydrates, lipids, proteins, and nucleic acids. These substances are used by your cells and often obtained through foods you eat.

Problem Statement:
Which foods contain carbohydrates, lipids, and proteins?

Predictions/Hypothesis:
Using the table below enter your predictions about which foods contain simple sugars, complex sugars, lipids, and proteins.

<table>
<thead>
<tr>
<th>Food</th>
<th>Simple Sugars</th>
<th>Complex Sugars</th>
<th>Lipids</th>
<th>Proteins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Juice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potato Juice</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Liquid Margarine</td>
<td></td>
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<tr>
<td>Egg Whites</td>
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<td></td>
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<tr>
<td>Fish Puree</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Egg Yolks</td>
<td></td>
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</tr>
</tbody>
</table>

Procedures – Testing Controls - Sketch all the procedures into your notebook.

Station 1: Simple Sugars Control Test:
1. Label two test tubes SS+ and SS- (for simple sugar positive and simple sugar negative).
2. Place 10 drops of water in the test tube labeled SS-. Place 10 drops of simple solution in the test tube labeled SS+.
3. Add 10 drops of Benedict’s solution to each test tube.
4. Place the test tubes into a boiling water bath for two minutes.
5. Any color change from blue (the color of Benedict’s solution) indicates a positive test for simple sugars.
6. Record your data in your science notebook.

Station 2: Complex Sugars Control Test:
1. Label two test tubes CS+ and CS- (for complex sugar positive and complex sugar negative).
2. Place 10 drops of water in the test tube labeled CS-. Place 10 drops of starch solution in the test tube labeled CS+.
3. Add four drops of Lugol’s solution to each test tube.
4. A color change from yellow/brown (the color of Iodine soln.) to black indicates a positive test for complex sugars.
5. Record your data in your science notebook.

Station 3: Lipids Control Test:
6. On a brown paper towel, label one side L+ and one side L- (for lipid positive and lipid negative).
7. Add 1 drop of water to the L- side and 1 drop of lipid solution to the L+ side. Allow the drops to dry.
8. A stain indicates a positive test for lipids.
9. Record your data in your science notebook.

Station 4: Proteins Control Test:
1. Label two test tubes P+ and P- (for protein positive and protein negative).
2. Place 10 drops of water in the test tube labeled P-. Place 10 drops of protein solution in the test tube labeled P+.
3. Add 10 drops of Biuret’s solution to each test tube.
4. Place the test tubes into a boiling water bath for two minutes.
5. A color change from blue (the color of Biuret’s solution) to pink or purple indicates a positive test for proteins.
6. Record your data in your science notebook.

When you are finished with your tests, empty test tubes into an approved container and clean thoroughly. Throw away paper towels. Clean your lab area, and wash your hands.
Identifying Biomolecules in Food – Lab Day 1

**Instructions:** Complete the procedures for each station.

**Data:** Enter your data for each station into the correct data table by writing your observation in each box.

<table>
<thead>
<tr>
<th>Station 1: Simple Sugars Test</th>
<th>Station 2: Complex Sugars Test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SS+</strong>&lt;br&gt;SS-&lt;br&gt;Brown&lt;br&gt;Blue</td>
<td><strong>CS+</strong>&lt;br&gt;CS-&lt;br&gt;Black&lt;br&gt;-Not Black-</td>
</tr>
</tbody>
</table>

**Station 3: Lipids Control Test**

| L+<br>L-<br>Stain<br>-No Stain- |

**Station 4: Proteins Control Test**

| P+<br>P-<br>Brown<br>Blue |

**Analysis:** Write, in your notebook, about how to identify the presence of each biomolecule.

Identifying Biomolecules in Food – Lab Day 2

**Instructions:** Complete the procedures for each station.

**Data:** Enter your data for each food type tested in the correct box by placing an ‘x’ for each biomolecule present.

<table>
<thead>
<tr>
<th>Food</th>
<th>Simple Sugars</th>
<th>Complex Sugars</th>
<th>Lipids</th>
<th>Proteins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple Juice</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Potato Juice</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Liquid Margarine</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Egg Whites</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Fish Puree</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Egg Yolks</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**Analysis:** Describe the biomolecules present in each food type in your notebook. Which compound is most common in foods that come from plants? Which compound is most common in foods that come from animals?

Identifying Biomolecules in Food – Post Lab

**Conclusion:** Write a summary of why the lab was conducted and what your results were.

**Guiding questions:**
- What was the purpose of the lab?
- What was your hypothesis?
- What was the purpose of day 1? What were the results? (example: the Benedict’s solution indicated _________)
- What was the purpose of day 2? What were your results?
- Was your hypothesis correct? What was different?
- What can you conclude about everyday foods and biomolecules? Why is that important?