Name: _____ TOC#_____

# Testing for Macromolecules

In this activity you see how to test types of foods to see if they contain carbohydrates (simple vs. complex), lipids or proteins.

**Part 1 Indicator Demo: Which indicator solutions can test for carbohydrates, protein, and lipids?**
Chemical indicators, are any substances that gives a visible sign, usually by a color change, of the presence or absence of a chemical compound. We can use indicator solutions to test for the presence of our macromolecules of life! An indicator solution is a good test for starch if it changes color in the presence of starch, but does not show the same color change in the presence of other molecules such as proteins, lipids or sugars. You will watch a demo and then evaluate which indicator solutions can be used to test for which macromolecules. We say that an indicator test is positive when the color change indicates that the macromolecules is present and negative if there is no color change indicating the lack of the macromolecule.

**We will use the following indicators:**

-Iodine Solution (yellow/brown→blue/black)
-Sudan III Solution (Red→ two layers)
-Benedicts Solution (blue→ orange/red)
-Biuret Solution

**We will test the following solutions with each indicator.**
We will see a color change with at least one of the indicators.

- Corn starch
- Potato starch
- Gelatin (protein from bones, skin, etc. of farm animals)
- Sucrose = table sugar
- Water
- Vegetable oil
- Powdered egg whites (high in protein)

1. **Predict: Complete this table using the list above**

| An indicator solution that is a good test for protein will change color when added to these samples: | An indicator solution that is a good test for protein will *not* change color when added to these samples: |
|---|---|
| | |
| An indicator solution that is a good test for lipids will change color when added to these samples: | An indicator solution that is a good test for lipids will *not* change color when added to these samples: |
| | |
| An indicator solution that is a good test for simple carbs will change color when added to these samples: | An indicator solution that is a good test for simple carbs will *not* change color when added to these samples: |
| | |
| An indicator solution that is a good test for complex carbs will change color when added to these samples: | An indicator solution that is a good test for complex carbs will *not* change color when added to these samples: |
| | |

3. Complete the following table as your teach demo's each reaction.

| Sample | Indicator Solution | What is the Color after indicator is added? | Is the sample is positive or negative | Sample | Indicator Solution | What is the Color after indicator is added? | Is the sample is positive or negative |
|---|---|---|---|---|---|---|---|
| Corn starch | Iodine | | | Gelatin | Iodine | | |
| | Sudan III | | | | Sudan III | | |
| | Benedict's | | | | Benedict's | | |
| | Biuret | | | | Biuret | | |
| Sucrose = table sugar | Iodine | | | Water | Iodine | | |
| | Sudan III | | | | Sudan III | | |
| | Benedict's | | | | Benedict's | | |
| | Biuret | | | | Biuret | | |
| Vegetable oil | Iodine | | | Powdered egg whites | Iodine | | |
| | Sudan III | | | | Sudan III | | |
| | Benedict's | | | | Benedict's | | |
| | Biuret | | | | Biuret | | |
| Potato starch | Iodine | | | | | | |
| | Sudan III | | | | | | |
| | Benedict's | | | | | | |
| | Biuret | | | | | | |

**Demo Analysis:**

1. Which indicator solution a good test for <u>complex carbs (aka polysaccharides/starch)</u>? Briefly summarize the evidence that supports your conclusion.

2. Which indicator solution a good test for <u>simple carbs (aka monosaccharides)</u>? Briefly summarize the evidence that supports your conclusion.

3. Which indicator solution a good test for <u>proteins</u>? Briefly summarize the evidence that supports your conclusion.

4. Which indicator solution a good test for <u>lipids</u>? Briefly summarize the evidence that supports your conclusion.

5. Which macromolecule did we not test? Can you find it in food?