Biology 12 **Name:** _____

Cell Biology **Per:** _____ **Date:** _____

Lab: Identifying Biological Molecules

Purpose **Part 1:** To determine which food samples contain simple carbohydrates (monosaccharide) or a complex carbohydrate (polysaccharide) using a specific chemical indicator for each.

Part 2: To determine which food samples contain proteins using a chemical indicator.

Apparatus and Materials

1. distilled water
2. glucose solution
3. starch solution
4. egg albumin
5. potato
6. gelatin
7. white bread (no crust)
8. white cheese
9. coconut
10. cooked chicken breast
11. canned white beans
12. milk

Part 1:
12 test tubes
test tube rack
hot plate
beaker
Benedict's solution
spot plate
Iodine solution (IKI)

Part 2:
12 test tubes
test tube rack
Biuret solution

Procedure

Part 1: Identification of Carbohydrates

1. Put 12 test tubes in a test tube rack. Use a grease pencil to mark each of the test tubes with the food item numbers (see list in materials). Place a consistent, small amount, of each food sample in a test tube.

2. Add 10 drops of Benedict's solution. Heat the mixtures in a hot water bath for 3-5 minutes and observe any colour changes (positive result is change from blue to green or yellow or reddish-brown in colour depending on the amount of **monosaccharide** present). Remove from the hot water bath and place in the test tube rack. Record observations in the data table.

3. Use the grease pencil to label the spot plate with the food identification numbers. Place a consistent, small amount, of each food sample on a drop plate.

4. Add 3 drops of the iodine solution and record any colour changes (positive result is change from yellow to black in colour). Record your observations in data table format. These are the results for identification of the presence of a **polysaccharide** (cellulose, starch or glycogen).

Part 2: Identification of Proteins

5. Put 12 test tubes in a test tube rack. Use a grease pencil to mark each of the test tubes with the food item numbers (see list in materials). Place a consistent, small amount, of each food sample in a test tube.

6. Add 10 drops of Biuret solution. Wait about 5 minutes before recording any color changes (positive result is change from blue to purple-violet in colour). Record your observations in data table format. These are the results for any food samples which have **peptide bonds**, the bond which links **amino acids** together to form a **protein**.

7. CLEAN UP
    a. Put the strainers in the bottom of the sink to capture any large food particles.
    b. With the water gently running, dump the contents of the test tubes in to the sink. Rinse the test tubes briefly and put them into the dirty test tube bin (ask teacher if unsure). Empty sink strainer into garbage can.
    c. Spot plates can be dumped directly into garbage can. Rinse in the sink and return to the cart.
    d. Return all other materials neatly to the cart.
    e. Wipe down work area and wash hands thoroughly as the indicators can be a skin irritant.
    f. Once everyone is done with their individual clean-up, students will be asked to ensure sinks are clean and dry, countertops are wiped down and all trash is thrown away.

Observations

Classification Carbohydrate (C) Protein (P) Both (B) Neither (N)	**Food Sample**	**Indicator Test Results** positive (+) or negative (-)		
		Benedict's Solution	**Iodine Solution**	**Biuret Solution**
		Monosaccharide	*Polysaccharide*	*Protein*
	1- Distilled Water			
	2 - Glucose solution			
	3 - Starch solution			
	4 - Egg albumin			
	5 - Potato			
	6 - Gelatin			
	7 - White bread			
	8 - White cheese			
	9 - Coconut			
	10 - Cooked chicken			
	11 - Canned white beans			
	12 - Milk			

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DETACH and hand in

Lab Questions: Identifying Biological Molecules

1. Complete the table.

	Monosaccharide	**Polysaccharide**	**Protein**
Indicator Used			
Negative Test Result			
Positive Test Result			

2. What was the purpose of using the…
    a. distilled water?
    b. glucose solution?
    c. starch solution?
    d. egg albumin?
3. What is one possible conclusion you could make if the distilled water tested positive for any of the tests?

4. How might the original colour or texture of the tested foods affect the test results?

5. Which biological molecule is most common in foods that come from
    a. plants?
    b. animals?
6. Name a food that tested positive for more than one biological molecule. _____

    Why might this be?

7. List at least three possible sources for error in this experiment (be as SPECIFIC as possible).
    a. _____
    b. _____
    c. _____