SBI 3C Name: _____

Macromolecule Murder Mystery

INTRODUCTION

Five people have been murdered…oh no! The police has taken stomach content samples from each victim, but they mixed them up. You are a macromolecule specialist and have been asked to help match the stomach contents samples with the known victims. The victims are the following 5 people:

Person Murdered	What do you think is a key component of their diet and might be found in their stomach?
Fred Fried	
Beth Bodybuilder	
Penny Potato	
Craig Carb	
Ben Balanced	

PURPOSE: To match the stomach samples with the victims based on tests specific for certain macromolecules.

MATERIALS:

15 test tubes, 5 paper towel squares, 1 pair of test tube tongs, 1 wooden splint, 1 hot plate, beaker with water, Biuret's reagent, Benedict's solution, Lugol's solution (or iodine), 5 10 ml pipettes, 1 pipette bulb, 5 eye droppers, stomach samples

PROCEDURE:

1. Please read the procedure before starting the lab. Get into groups of 3 or 4.

2. Label 3 empty test tubes with the following labels using masking tape and/or wax pencil, and label each set of test tubes Sample A-E:
    1) Starch Test
    2) Monosaccharide Test
    3) Protein Test

STARCH TEST:

1. Add 2 ml from Sample A and add 2 drops of Lugol's to test tube #1
2. Record observations in the table below.

MONOSACCHARIDE TEST:

1. Add 2 ml from Sample A and 5 drops of Benedict's solution to test tube #2.
2. Place the test tube in a boiling water bath for 5 minutes.
3. Remove the test tube using tongs and place in the test tube rack
4. Record observations in the table below.

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LIPID TEST:

1. Place 3 drops of victims A's stomach contents onto a piece of paper towel.
2. Allow the paper towel to dry (or blow on it lightly)
3. Hold the paper towel up to the light.
4. Record the observations in the table below.

PROTEIN TEST:

1. Mix 2ml of victim A stomach contents and 5 drops of Biuret solution into test tube #3.
2. Mix carefully with wooden splint.
3. Record observations in the table below.

Repeat the four macromolecule tests with Samples B, C, D and E.

OBSERVATIONS:

	STARCH TEST	MONOSACCHARIDE TEST	LIPID TEST	PROTEIN TEST
Sample A				
Sample B				
Sample C				
Sample D				
Sample E				

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CONCLUSIONS:

Sample	Based on macromolecule testing, What molecule(s) is present?
A	
B	
C	
D	
E	

Sample A was most likely _____

Sample B was most likely _____

Sample C was most likely _____

Sample D was most likely _____

Sample E was most likely_____

CHEAT SHEET:

TEST	Positive Test Result
Starch Test	Iodine turns bluish black
Monosaccharide Test	Benedict's turns green, yellow, orange or red
Lipid Test	Paper becomes translucent in the presence of lipids
Protein Test	Biuret turns a pink/purple colour

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DISCUSSION:

1. It is important to have a "balanced diet" because different macromolecules have different functions in your body. Fill in the table below regarding these functions.[4]

Molecule	Function in Body
Starch	
Monosaccharides	
Lipids	
Protein	

2. Did any of the above victims have a "balanced diet" explain your answer.[2]

3. If you tested the following foods with each test above, predict which tests would be positive and which would be negative by putting a + or a – in each box of the table. [4]

Food	Starch Test	Monosaccharide Test	Lipid Test	Protein Test
Potato				
Coke				
Hamburger				

4. Would all carbohydrates show a positive starch test? Explain.

5. Why do you think the oil spot on the brown paper is translucent when held up to a light source?

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Marking Rubric

Categories	Level 1	Level 2	Level 3	Level 4
Knowledge and understanding of lab and content /10	Demonstrates limited knowledge and understanding of content in answering discussions questions and carrying out lab procedure	Demonstrates some knowledge and understanding of content in answering discussions questions and carrying out lab procedure	Demonstrates considerable knowledge and understanding of content in answering discussions questions and carrying out lab procedure	Demonstrates thorough knowledge and understanding of content in answering discussions questions and carrying out lab procedure
Application of concepts learned in class /10	Makes limited observations in lab, many observations are lacking; poor lab technique	Makes a number of observations with very few lacking, acceptable lab technique	States all observations in good details; good lab technique	Detailed observations and excellent lab technique
Thinking and Inquiry to solve murder mystery and make correct conclusions /10	Uses critical thinking about macromolecules with limited effectiveness, conclusions are largely wrong	Uses critical thinking with some effectiveness; conclusions are correct with some errors	Uses critical thinking with considerable effectiveness; conclusions are correct	Uses critical thinking with a high degree of effectiveness; conclusions are correct with explanation
Communication How your ideas are expressed /10	Expresses and organizes ideas with limited effectiveness	Expresses and organizes ideas with some effectiveness	Expresses and organizes ideas with considerable effectiveness	Expresses and organizes ideas with a high degree of effectiveness