Who Stole Kaleb's iPod?

The crime…

Kaleb is a 10th grade student at City High School who works at McDonald's on the weekends. While on break, Kaleb was studying for his biology test and listening to his new iPod. There were four other workers taking a break at the same time, each having something different for lunch.

Kaleb's girlfriend stopped by near the end of his break, and he rushed out to see her and forgot his iPod and biology book in the break room. When he realized, he hurried back and found only his biology book and some food crumbs. His iPod was gone!

First Kaleb freaked out, but he calmed down when he realized he could use his knowledge of organic compounds to figure out which of his coworkers left the crumbs on his textbook and who took his iPod.

Think about it...

What are organic compounds?

Almost all of the food we eat comes from plants and animals. Plants and animals contain mainly water and organic compounds, which are molecules made by living organisms such as plants or animals.

- The table (*pull tab 1*) will list the most common types of organic compounds found in living organisms.

- IN EACH GROUP, give one or two examples for each type of organic compound and describe one characteristic, e.g. whether it is greasy, whether it contains genetic material, whether there is lots of this type of organic compound in meat or lots in pretzels and potatoes.

Think about it...

Type of Organic Compound	Examples	Characteristic or Type of Food That Has Lots of This Type of Organic Compound
Carbohydrates		
Lipids		
Nucleic acids		
Proteins		

Think about it...

Think about it EVEN MORE ...

Today you will be testing the substances listed in the table below. In your ISN, predict what type(s) of macromolecule will be found in each substance?

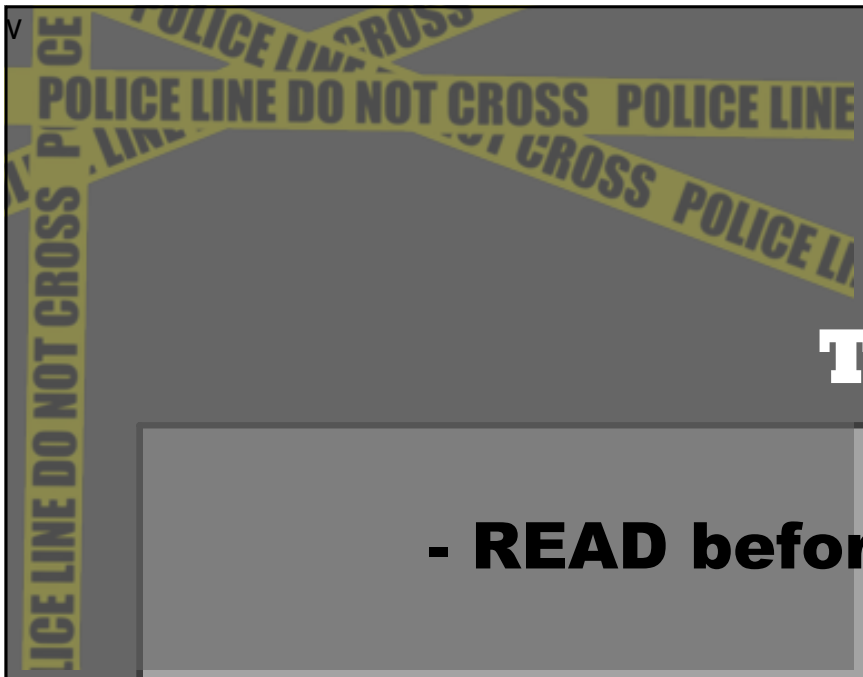
Substance	Do you think this substance is a carbohydrate, lipid, protein, or none of these?
Vegetable oil	
Glucose	
Starch from corn or potatoes	
Powdered egg whites	
Water	

Day 1

What are indicators?
An indicator is a substance that changes color in the presence of a particular type of molecule. Today you will learn how to use several indicators to test for the presence of carbohydrates and proteins. You will also use a different type of test for lipids. In your next class, you will use these tests to analyze several types of food and the evidence left at the scene of the crime to find out who left the crumbs on Kaleb's textbook.

You will run 4 tests (using indicators):

- The Paper test to check for Lipids
- The Benedict's test to check for Glucose
- The Iodine test to check for Starch
- The Buiret's test to check for Proteins

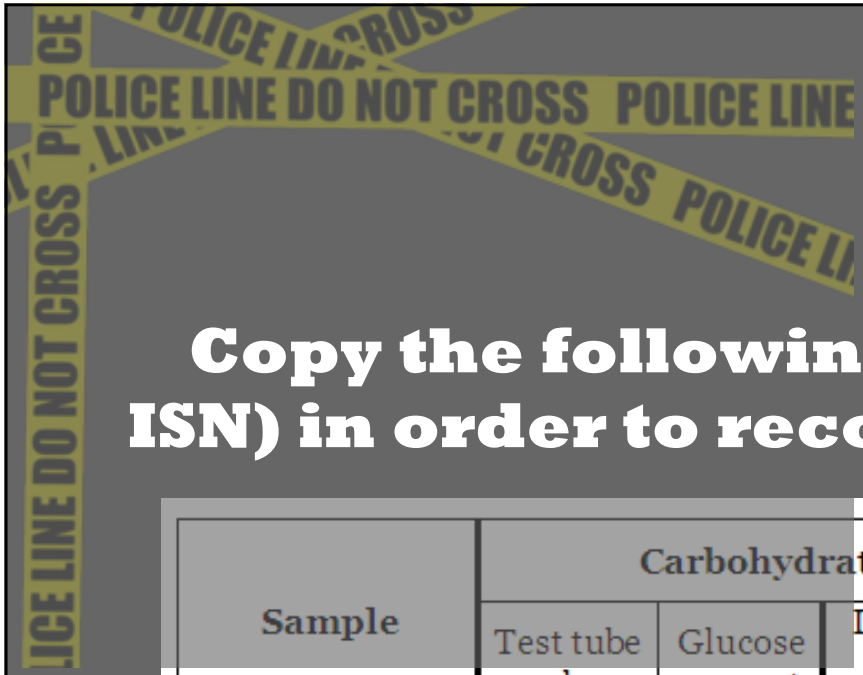


TIPS:

- READ before experimenting

- If you are unsure, ask!!

- Keep your work station clean and clear (only bring over what you need)



Copy the following data table (in your ISN) in order to record your DAY 1 results:

Sample	Carbohydrate Tests				Protein Test		Lipid Test
	Test tube color	Glucose present	Iodine test color	Starch present	Biuret test color	Protein present	Lipid present
Vegetable oil							
Glucose							
Starch from corn or potatoes							
Powdered egg whites							
Water							

Things to think about...

Compare your predictions with your results...were there any differences? If so, why?

Did your test for glucose indicate there was glucose in the starch sample? If no, then does that mean there is no glucose in starch?

Suppose that your water sample tested positive for one of the macromolecules. How would you interpret this?

Things to think about...

Did not realize exactly what each food was made up of

The glucose indicator is very specific. It reacts with glucose dissolved in water but it does not react with glucose molecules that are combined into a larger organic compound like starch

Water is not amde of any of the organic macromolecules thus there must have been some cross-contamination

Day 2

Copy the following data table in your ISN

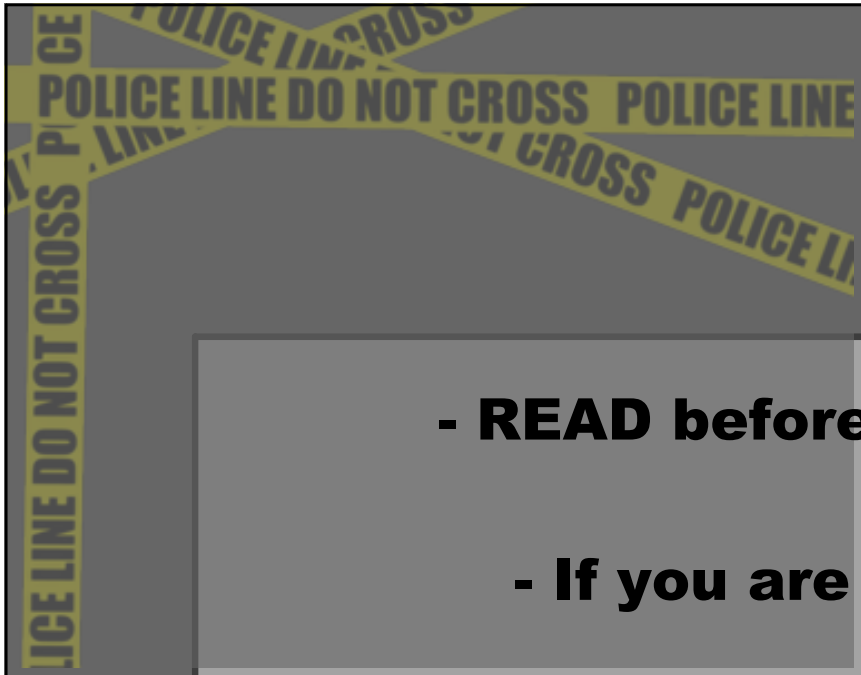
Today you will perform all four organic compound tests on one or two of the types of food listed below or the evidence Kaleb found at the crime scene (your teacher will assign you a sample or samples to test). Begin by predicting which types of compounds you expect to find in each type of food you will be testing.

Food	Do you expect this food to contain			
	Glucose?	Starch?	Protein?	Lipid?
Pretzel				
Butter				
Jelly				
Fat-free yogurt				
Beans				

When done preditcintg

Create the following data table in your ISN in order record your DAY 2 results:

Food	Carbohydrate Tests				Protein Test		Lipid Test
	Test Tube color	Glucose present	Iodine test color	Starch present	Biuret test color	Protein present	Lipid present
Pretzel (crumble into the container)							
Butter							
Jelly							
Fat-free yogurt							
Beans (mash into a paste)							
Bread							
Tortilla							
Cheese							



TIPS:

- READ before experimenting

- If you are unsure, ask!!

- Keep your work station clean and clear
(only bring over what you need)

- Be sure to label your test tubes

- Be sure to wash test tubes well
(to avoid cross-contamination)

Things to think about...

1a

In this lab you have recorded whether an indicator tested positive or negative for each type of organic compound. We have ignored the fact that different foods contain different amounts of the various types of organic compounds. *For example*, cream cheese and cottage cheese both have fat and protein, but cream cheese has much more fat than protein, whereas cottage cheese has much more protein than fat.

Things to think about...

1b

Most foods contain at least a tiny amount of proteins and lipids since all cells in a plant or animal need to have at least some lipids and proteins. Did you get a positive test for proteins and lipids in all the foods you tested?

How can you explain any cases where you did not get a positive test for proteins and lipids?

Things to think about…

Different colors might have been recorded for the glucose test strips, potentially identifying foods that have smaller amounts of glucose vs. larger amounts of glucose.

- Some foods test positive for glucose, but may not taste sweet. What is one possible explanation?

- Some foods might taste sweet, but have very little glucose. What is one possible explanation?

2

So...who stole Kaleb's iPod?

Now, you will use your knowledge and results to determine the iPod thief.

Create the following data table in your ISN in order to help you find the theif

Worker in break room	Lunch/Snack	Glucose	Starch	Protein	Lipid
Jose	Bean burrito with cheese				
Ashley	Fat-Free Yogurt				
Bruce	Toast with butter and jelly				
Kiara	Pretzel				
Thief (SAMPLE ___)	*(write in what was in the evidence sample)*				

Check off what macromolecules would be found in each snack

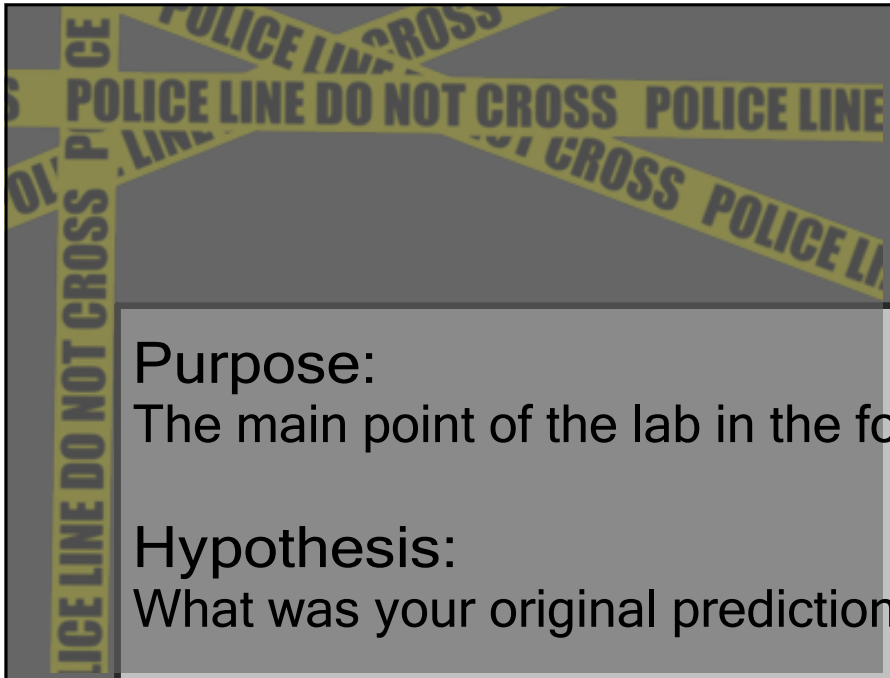
Be sure to think about ALL possibilities and food combinations.

So…who stole Kaleb's iPod?

Just like in any court of law, you need to evidence to support your allegation

Create the following data table to summarize your evidence and support your accusation

Workers	Did he/she take Kaleb's iPod?	How do you know? Describe the evidence that supports your conclusion.
Jose		
Ashley		
Bruce		
Kiara		



What should be included in the Lab Writeup?

Purpose:
The main point of the lab in the form of a scientific question.

Hypothesis:
What was your original prediction about the iPod thief?

Data:
- Data table with DAY 1 results (water, oil, sugar, egg whites & potato)
- Data table with DAY 2 results (from testing all sample foods)
- Data table with EVIDENCE results

Analysis & Conclusion:
Paragraph 1: Include a discussion of your evidence and who you thought took the iPod along with 3 examples of that support your hypothesis. (no discussion of a relationship)

Paragraph 2: Include unexpected result(s), 2 errors and how to prevent them, 2 suggestions of how to branch off for future experiments