

Food Explorations Lab I: Sweet Saccharide

STUDENT LAB INVESTIGATIONS

Name: _____

Lab Overview

In this investigation, your group will test sugar solutions to determine their glucose content and to determine the solutions' identities. You will also calculate the calories contained in the sugar solutions and consider how a person's sugar intake can be reduced.

Lab Objectives

In this lab, you will learn how to...

1. Determine the glucose concentration of unknown sugar solutions.
2. Determine the identity of three unknown liquid substances based on their glucose concentration.
3. Identify foods containing glucose, fructose, and sucrose.
4. Calculate calories in food due to simple sugars.
5. Describe how a diet can be modified to reduce sugar intake.

Lab Safety: Before beginning ANY investigation you should put on your safety goggles and apron. It is important to avoid getting chemicals on your hands. Always wash your hands following completion of an investigation. When handling food, you should also wash your hands prior to beginning an investigation.

Lab Question

Which of the following substances do you think will have the greatest concentration of glucose?
(Circle your answer.)

Apple Juice

Grape Juice

Table Sugar/Water Solution

Predictions: I predict _____ will have the greatest concentration of glucose because...

Will the glucose concentration be high or low in each liquid solution? Provide an explanation for your response. (Circle your answer.)

APPLE JUICE:

HIGH

LOW

GRAPE JUICE:

HIGH

LOW

SUGAR CANE (SUGAR WATER):

HIGH

LOW

Observation of Unknown Samples

MATERIALS

4-8 Glucose Test Strips	Paper towels or napkins
Unknown Sample A	safety goggles
Unknown Sample B	aprons (optional)
Unknown Sample C	
Control (water)	
Stopwatch or kitchen timer	
Glucose Color Chart	

PROCEDURE

1. Obtain your 3 unknown samples from your teacher and the control (water).
2. Observe each sample. Record observations in Table A under the column labeled "Liquid Appearance."
3. Start with the control. Measure the glucose concentration of the control by dipping 1 glucose strip into the cup. After dipping, blot each side of the strip on a paper towel or napkin to remove the excess fluid. Not removing the extra fluid from your strip through blotting can result in an incorrect measurement.
4. Wait 30 seconds for the color of the strip to develop; then compare the color of the strip to the *Glucose Reference Color Chart*. Be sure to read your test strip at **exactly** 30 seconds. Record your answer in Table A under the column labeled "Test Strip Color at 30 Seconds."
5. One at a time, repeat steps 3-4 with all three unknown samples. Be sure to use a new strip each time, wait exactly 30 seconds, and record your data in Table A under the column labeled "Test Strip Color at 30 Seconds."

Table A: Unknown Sample Observations and Glucose Testing

	Liquid Appearance	Test Strip Color at 30 Seconds
Control (Water)		
Sample A		
Sample B		
Sample C		

Conclusion:

1. Using the *Glucose Reference Color Chart* provided, record the glucose concentration for each of your samples in Table B.

TABLE B: Glucose Concentrations and Substance Identification

	Glucose Concentration (At 30 seconds)	Identity of Substance	Explanation
Control			
Sample A			
Sample B			
Sample C			

2. Using the data presented in Table C, calculate the % glucose for each food item.

Food Item	Total Sugar	Free Fructose	Free Glucose	Sucrose	% Glucose
Example Juice					

Table C: Calculating % Glucose in Food Items

Food Item	Total Sugar	Free Fructose	Free Glucose	Sucrose	% Glucose
Apple Juice					
Grape Juice					
Sugar Water					

Apple:

Grape:

Table Sugar Water:

3. Compare and contrast your results in Tables A and B to your original responses to the lab question. Describe similarities and differences.

4. Complete Table B on page 210. The sugar solutions used in this investigation were grape juice, apple juice, and sugar water. Match the sugar solution to each unknown and provide an explanation to support your answer.

5. The table sugar water and grape juice solutions have similar sugar concentrations, but the glucose concentrations were different. Explain why this is possible.

6. What types of foods are naturally high in fructose? Glucose? Sucrose?

7. Fructose, glucose, and sucrose are types of carbohydrates in the diet that can provide energy for the body in the form of calories. Calculate how many calories from total sugar each beverage contains. (HINT: To find total calories multiply Total Sugar in Table C by 4 grams/calorie.)

Apple:

Grape:

Table Sugar Water:

8. Based on the reading "Sugar Solutions", what does the body do with sugar that is consumed but not needed for the body's current energy needs?

9. Identify two sources of added sugar you regularly eat or drink. Name one way you can decrease your intake of extra sugar.