In your lab summary you are testing one hypothesis and should have only one prediction. The independent (x) and dependent (y) variables should be based on your prediction.

Student Name: **Date:**

Laboratory 3: Function and Properties of Cells (Activity 5 Osmosis experiment) [*Give the laboratory a descriptive title*]

Purpose of Experiment: [*This may be stated in the form of a research question*]

To demonstrate that water will, by the process of osmosis, pass through a semi-permeable membrane.

Hypothesis: [*This experiment lacked a control, the null hypothesis does not apply*]

Biological membranes are permeable to the movement of molecules of certain sizes. These molecules exhibit the tendency to move along a gradient from high to low concentration; therefore water will diffuse across a semipermeable membrane (**cellulose dialysis tubing**), from a region of high water concentration to a region where the concentration of water is low..

Prediction:

If the concentration of water molecules in pure distilled water is greater than the concentration of water molecules in the stock solution, **then** water molecules will diffuse into the dialysis bag (containing stock solution); moving along a concentration gradient from high to low water concentration. The distilled water will move across the membrane into the stock solution, resulting in an increase in the weight of the dialysis bag.

Materials: [*This section is not important to include, if everyone is doing same procedures*].

1. Dialysis tubing, 12cm strips, prepared for usage by soaking in distilled for several minutes.
2. Stock solution containing: starch, glucose, sodium chloride (NaCl).
3. Beakers
4 Graduated cylinders
8. Pipettes
9. Digital electronic balance
10. Distilled water

Methods: [*Carefully describe the methods you used to conduct your study.*]

Dialysis component

1. One end of the rehydrated strip of dialysis tubing was tied off with twine.
2. 20ml of stock solution was transferred to the dialysis bag. The open end of the bag was tide off, such that the bag was turgid and nearly filled. Excess tubing was trimmed from the ends of the bag.
3. The exterior of the dialysis bag was blotted dry. The weight of the bag prior to dialysis was measured to the nearest tenth of a gram.
4. The dialysis bag was rinsed briefly, with distilled water to remove potential surface contaminants, and immediately transferred to a beaker containing 400ml of distilled water. The bag was completely immersed in water and not bent.

Methods continued:

5. Dialysis proceeded for 20 minutes, at room temperature, with occasional swirling of the beaker to facilitate diffusion.
6. The bag was removed from the water, after 20 minutes of dialysis, and blotted dry. The post dialysis weight was measured to the nearest tenth of a gram.
7. The change in weight (in grams) and the percent weight change of the dialysis bag were calculated. An increase in weight will indicate water diffused into the dialysis bag. Whereas, weight loss may suggest the bag was inadequately prepared for dialysis.

Variables:

The change in weight of the dialysis bag (dependent variable) is due to the movement of distilled water (independent variable) into the bag; which is caused by, the difference in concentration of dissolved solute in the distilled water and the stock solution (the stock contained salt, glucose and starch).
A control for comparison (a dialysis bag containing dH_2O) was not run against the experimental dialysis bag, but would have been the best choice for a control.

Results:

The weight of the dialysis bag increased by 4g, after 20 minutes of dialyzing in distilled water (**Graph 1**).
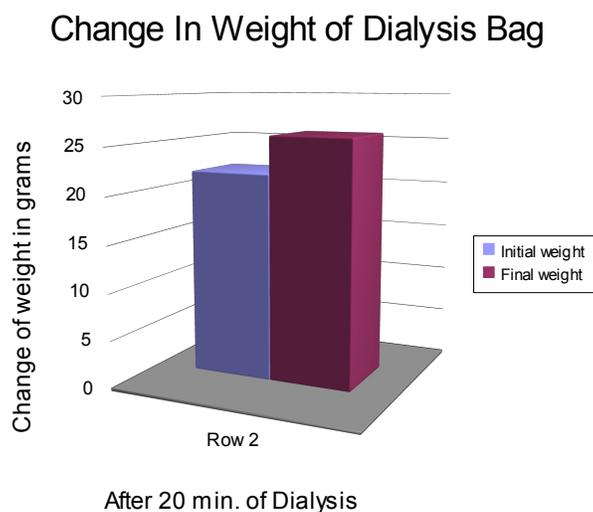**Calculations:**
The initial weight of the bag prior to dialysis was **22.0g** and after 20 minutes of dialysis the weight increased to **26.0g.** The weight increased by **4.0g** in 20 minutes or approximately **0.2 g/ min (Graph 1**).
The percent weight change was (**calculation**):   **[(26 - 22)/ 22] * 100 = + 18.2%** increase in weight.

Tables and Graphs

Graph1

The change in weight of one dialysis bag, after 20 minutes of dialyzing in dH_2O. The blue bar represents the pre dialysis weight of the bag and the purple bar is its post dialysis weight.

Accept or Reject Hypothesis:

The stated hypothesis for osmosis in this experiment:

Biological membranes are permeable to the movement of molecules of certain sizes. These molecules exhibit the tendency to move along a gradient from high to low concentration; therefore water will diffuse across a semipermeable membrane (**cellulose dialysis tubing**), from a region of high water concentration to a region where the concentration of water is low..

The hypothesis must be accepted on the basis of the following lines of evidence:

1. The weight of the dialysis bag increased by 4g, a positive increase of 18.2%. This clearly indicates how freely distilled water crosses the barrier posed by the dialysis bag.

2. The concentration gradient created when the stock solution was dialyzed against distilled water was responsible for the movement of water and ultimately, the increased weight of the dialysis bag.

3. The distilled water (region of high water molecule concentration) diffused through the semipermeable cellulose membrane, into the stock solution (region of lower water molecule concentration), following the concentration gradient.

The observations above, support the proposed hypothesis and explains how water moved across the membrane provided by the dialysis tubing used in this experiment.

Rubric for NSB121 laboratory summary.

Include a rubric with the laboratory summary.

		Points Earned	Possible Points	Comments
Headings	Place your name, the due date, and title of the laboratory as shown in the example of the lab summary format.		1	
Purpose of the experiment	(The purpose of this experiment is...), this may be stated in the form of a question (What concentration of a hypertonic solution best removes water from potato cores?)		2	
Null Hypothesis & Alternative Hypothesis (if possible) and Prediction	**Hypothesis,** follow this with a **Prediction** (based on the hypothesis) use (If...then...). Each statement should be concise and stand alone, you may add statements to support your hypothesis or prediction. Labeled each section as hypothesis and prediction.		4	
Materials	Simple "listing" of the most important or essential equipment		1	
Methods	A list containing the most essential procedures (with some details).		3	
Variables	Clearly state the experimental variable and its control. Indicate the dependent (y) and independent variables (x) for the experiment.		2	
Results	Explanation of observed trends. If it helps, you may list these. Refer to calculations, tables, and graphs in the results section of the summary.		3	
Tables/ Graphs	Place raw data and calculated data in tables when possible. Use graphs with titles, and labeled axes when possible. When numeric data is not generated use a flow chart to represent results.		3	
Accept or reject hypothesis	Explain why you accepted or rejected your hypothesis, **based on your data** (results).		2	
Presentation	Neatness, effort, grammar (highest number of points).		4	
Total			25	

This assignment may be submitted by e-mail in the form of an attached PDF file.
The rubric must be included as the last page in your summary.
Two (2) points will be deducted from this assignment if the rubric is not attached.