

Osmosis Egg Lab

Introduction: You will be investigating osmosis by testing the effect of various solutions on the mass of an egg. Your group will also be given a mystery solution to test.

Question: How will different concentrations of sugar solutions effect the percent change in the mass of an egg?

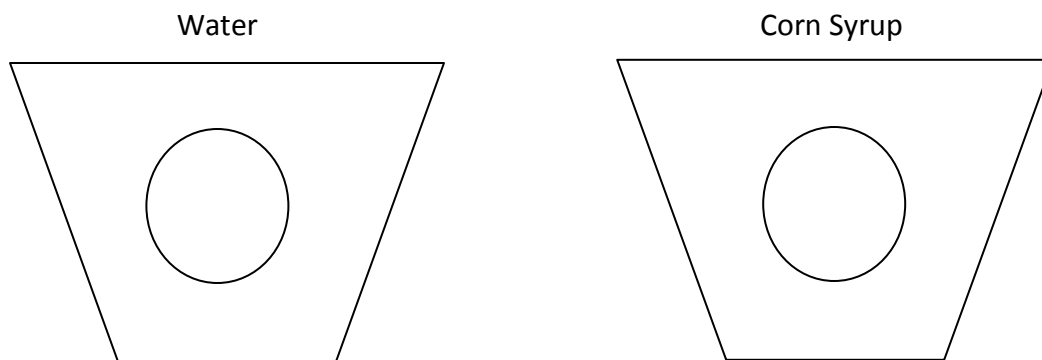
Hypothesis: Write a hypothesis for the water solution cup and the corn syrup solution cup. Each hypothesis must include one of the following terms: *isotonic, hypertonic, or hypotonic*

Part 1

- Hypothesis 1: _____

- Hypothesis 2: _____

Diagrams: For each of the solutions being tested, draw in the **solute** (use dots to represent this) found either in the cup and/or the egg. Be sure to add more dots to the sides that contain more solute. Label the **high water side and the low water side**, and include an **arrow** to show the movement of the water. REMEMBER: the solute is too big to pass through the membrane.



Experiment:

- Variables: List the Independent variable, Dependent variable, and at least 2 Constants (Constants are things that need to be kept the same in each experimental setup)
 - Independent = _____
 - Dependent = _____
 - Constants = _____

- Materials: plastic cups, 2 eggs, water, corn syrup, electronic balance, weigh boat, calculator, spoon, permanent marker and paper towels

Group Data Charts

	Egg Mass (g)	Other Observations
Water Egg – Egg 1	Initial (Day 1) =	
	Final (Day 2) =	
Corn Syrup – Egg 2	Initial (Day 1) =	
	Final (Day 2) =	
Mystery Solution _____ – Egg 3	Initial (Day 1) =	
	Final (Day 2) =	

Calculate Change in Mass for Each Egg: *These numbers can be negative or positive*

	Column A	Column B
Solution Type	Change in Mass (Final – Initial)	% Change in Mass (Column A / Initial Mass) x 100
Egg 1: Water		
Egg 2: Corn Syrup		
Egg 3: Mystery Solution _____		

Class Data Chart: Compare the % change in mass of each egg and assign the correct % sugar content for each solution.

Solution Type	% Change in Mass	Amount of Sugar
Water Egg		
Corn Syrup		N/A
Mystery Solution A		
Mystery Solution B		
Mystery Solution C		
Mystery Solution D		
Mystery Solution E		

Analysis

- Graph the Class Data percent change in mass for each % sugar solution tested. You will use an appropriate type of graph, an appropriate title for the graph, LABEL AXES including units of measurement and **provide a key for your data**. Graph each of the solutions on the same graph.

Conclusion

1. What substance was moving in and out of the eggs?
2. Why was the percent change in mass data used to compare the egg's change in size?
3. Why was it necessary to soak the eggs in vinegar before the start of the lab?
4. **For the 2 known solutions tested: water and corn syrup** write a paragraph using data from the lab to explain what happened to the size of each egg.
 - a. Be sure to include:
 - i. statement of your claim/hypothesis
 - ii. evidence including % change in mass and observations
 - iii. osmosis environment name involved
 - iv. where there was a high and low concentration of solute and of water
 - v. explanation of why the water moved
5. **Explain** the relationship between % change in mass and % sugar observed in the class data. This will be a statement of what the data showed and why it occurred.
6. **Error Analysis:** Explain at least 2 possible sources of errors and how they could have impacted your results.
7. **Extension Question:** Salt is placed on the roads during the winter to help melt the ice. Unfortunately, sometimes the plants that grow next to the road die off. Based on what you have learned about osmosis, provide an explanation for what is happening in the plant's cells when the salt water surrounds them.
 - a. Your answer must include the name of the environmental solution, where there is a high and low concentration of water, and how will the water move.

Osmosis Lab Report Rubric

Create a mini tri-fold poster with your group to be turned in as one lab grade. Each group member must contribute equally and everyone's handwriting should be seen on the poster.

	Points Possible	Points Earned
Introduction <ul style="list-style-type: none"> - Discuss the following terms in a paragraph format: osmosis, passive transport, hypertonic, hypotonic, isotonic, equilibrium, concentration gradient 	7	
Experimental Setup <ul style="list-style-type: none"> - Question - 2 Hypotheses - 2 diagrams correctly filled in with solute, high and low concentration, and arrows - Variables – independent, dependent, and constants 	2 6 6 6	
Data <ul style="list-style-type: none"> - Complete group data chart <ul style="list-style-type: none"> o Up to 4 points off if data is not listed to the hundredths place - Complete % change in mass chart <ul style="list-style-type: none"> o Answers need to be rounded to the nearest tenths place - Complete class data chart 	12 6 6	
Analysis <ul style="list-style-type: none"> - Graph of the data for the different solutions <ul style="list-style-type: none"> o Include: correct type of graph with correct orientation of the axes (3pts), title (1pt), labels and units for axes (4pts), and correct data plotted (6pts) 	14	
Conclusion <ul style="list-style-type: none"> - Q1: What substance is moving in and out of the eggs? 3 - Q2: Why was the percent change in mass data used to compare the egg's change in size? 3 - Q3: Why was it necessary to soak the eggs in vinegar before the start of the lab? 3 - Q4: 2 paragraphs explaining what happened to the eggs in the water and corn syrup (6pts each) 12 <ul style="list-style-type: none"> ▪ statement of your claim/hypothesis ▪ evidence including % change in mass ▪ osmosis environment name involved ▪ where there was a high and low concentration of solute and of water ▪ explanation of why the water moved - Q5: Explain the relationship between % change in mass and % sugar observed in the class data 4 - Q6: 2 sources of error and impact on results 4 - Q7: extension question 6 	3 3 3 12 4 4 6	
Total	100	