

The Naked Egg Lab

Name _____ Date _____ Period _____

Purpose: Explain the processes of diffusion and osmosis.

Problem: How can an egg be used to prove osmosis and diffusion have occurred?

Background Information: Cells have an outer covering called the cell membrane. This membrane is selectively permeable; it has tiny pores or holes that allow objects to move across it. The cell membrane controls what moves in and out of the cell. Food and oxygen move into cells across the cell membrane through the process of diffusion. Diffusion is movement of a substance from an area of high concentration to an area of low concentration. ***Osmosis is a special type of diffusion; it is the diffusion of water across a selectively permeable membrane.*** Osmosis occurs when water moves from an area where it is more concentrated to an area where it is less concentrated.

In this lab you will be using an egg with the shell removed, a “naked” egg. The shell-less egg will represent a cell and its selectively permeable membrane. You will remove the shell of the egg by soaking the egg in vinegar. The egg shell is made up of the mineral calcium carbonate. Calcium carbonate dissolves in acids such as vinegar. During this process it releases the gas carbon dioxide. After the shell has been dissolved, only the membrane will remain around the egg.

<u>Materials:</u>	beaker	raw egg	vinegar	wax paper
	corn syrup	colored water	triple beam balance	
	spoon	masking tape	paper towels	

Part 1 – Making a Naked Egg

1. Gather the following materials: raw egg, triple beam balance, masking tape, beaker.
2. Write your names and period on a piece of masking tape, and place it on the beaker
3. Carefully measure the mass of the raw egg using the triple beam balance. Record the mass on the chart beside “Day 1.”
4. Look at the raw egg, and write two observations you notice about the egg on the chart beside “Day 1.”
5. Carefully place the egg in a beaker. Pour vinegar in the beaker until it just covers the egg.
The egg will float. A small part of the egg will not be submerged in the vinegar.
6. Place the beaker on the counter, and return the other materials to the supply table.

Hypothesis: Predict how the egg will respond when left in vinegar for 24 hours.

I hypothesize that _____
_____.

Part 1 Reflection: Answer the following questions.

1. What do you think would happen to a shell-less (“naked”) egg if water passed into the egg through the membrane?

2. What do you think would happen to a naked egg if water passed out of the egg through the membrane?

Data and Observations

Day	Mass of Egg (in grams)	Observations
1		1. 2.
2		1. 2.
3		1. 2.
4		1. 2.
5		1. 2.

Part 2 – Exposing the Cell Membrane

Today you will continue to observe your naked egg and remove the shell. The acetic acid in the vinegar has dissolved most of the shell. You will be able to gently rub a good bit of the shell off the egg using your hands.

1. Pour off the vinegar down the drain. Catch the egg with your hand.
BE CAREFUL!! THE EGG WILL BE VERY FRAGILE!
2. Gently rinse the egg off under running water. Rub away any of the shell you can using your fingers.
3. Move the egg to a paper towel and pat it dry.
4. Measure the mass of the egg using a triple beam balance. Record the mass on the chart beside "Day 2."
5. Look at the raw egg, and write two observations you notice about the egg on the chart beside "Day 2."
6. Carefully place the egg back in the beaker. Pour vinegar in the beaker until it just covers the egg.
7. Place the beaker on the counter, and return the other materials to the supply table.

Part 2 Reflection: Answer the following questions.

1. What happened to the size of the egg after remaining in vinegar?
2. Why did the egg change size? (Use words such as: molecules, concentration, low, high, and move.)
3. Look back at your hypothesis from Part 1. Was it correct or incorrect? Why?
4. What do you expect to see when you observe your egg tomorrow?

Part 3 – Osmosis in Action

Today you have a naked egg. The shell has been completely dissolved by the vinegar. Acetic acid makes up 5% of the liquid in vinegar. Water makes up the other 95% of the liquid in vinegar. There are also some other changes that have happened with your egg.

Remember: Osmosis is the process of water moving through a membrane. Osmosis makes the concentration of water molecules inside and outside the cell the same.

1. Pour off the vinegar down the drain. Catch the egg with your hand.
BE CAREFUL!! THE EGG WILL BE VERY FRAGILE!
2. Rinse the egg under running water and pat dry using a paper towel.
3. Measure the mass of the egg using a triple beam balance. Record the mass on the chart beside "Day 3."
4. Look at the naked egg, and write two observations you notice about the egg on the chart beside "Day 3."
5. Rinse out the beaker. Carefully place the egg back in the beaker.
6. Pour corn syrup in the beaker until it just covers the egg.
The egg will float. A small part of the egg will not be submerged in the corn syrup.

Hypothesis: Predict how the egg will respond when left in corn syrup for 24 hours.

I hypothesize that _____
_____.

Part 3 Reflection: Answer the following questions.

1. What happened to the size of the egg after remaining in vinegar for a second day?

2. Vinegar is made up of 5% acetic acid and 95% water.
What effect did the acetic acid have on your egg?

What effect did the water have on your egg?

3. What do you expect to see when you observe your egg tomorrow?

