

# Experiment 11

## An Eggsperiment

### OUTCOMES

After completing this experiment, the student should be able to:

- explain the process of osmosis and give several examples of osmosis from everyday experiences.
- predict what happens to red blood cells placed in hypotonic, hypertonic, and isotonic solutions.

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### DISCUSSION

This experiment was intended to be a take-home lab. The author's experience has shown this experiment to be very intriguing to younger children, as well as adults. In fact, it has been used as the basis for several science fair projects for children of the author's students. There is so much to be learned from such a simple experiment for all ages. This is certainly one of the author's favorite kitchen chemistry experiments.

Osmosis may be defined as the movement of water or other solvents through a semipermeable membrane into a solution of higher molar solute concentration. The movement of solvent tends to continue until the solute concentrations on each side of the membrane have been equalized. A semipermeable membrane is one that allows certain smaller molecules to pass through, while retaining the larger molecules. It is essentially a submicroscopic filter.

Osmosis occurs in all living organisms and is extremely vital to the balance of fluids in cells and tissues. There is much more to be said about osmosis and you are encouraged to look into it on your own. There are three additional terms you will frequently encounter when dealing with osmosis — a *hypotonic solution* has a lower solute concentration than inside a membrane; a *hypertonic solution* has a higher solute concentration than inside a membrane; an *isotonic solution* has a solute concentration equal to that inside a membrane.

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### PROCEDURE

1. Obtain the following materials: one raw egg, vinegar, corn syrup or honey (a saturated solution of table sugar is a suitable substitute), and one or two small bowls.
2. Place the egg (do not crack the egg) into a glass or bowl and cover the egg with vinegar. Leave the egg in the vinegar for about 24 hours. If there is still a thin coating of shell

remaining after the 24 hours, replace or add more vinegar. Allow to react until all of the shell is gone. Record your observations.

**REQUIRED PHOTO 1: A selfie that also shows the egg after 24 hours in vinegar. The entire shell should clearly be removed.**

3. The outer membrane may be fragile, so handle the egg with care. Remove the egg from the vinegar and rinse it with water. Place the egg into a bowl containing enough corn syrup to cover most of the egg. Allow to sit for about 1 day and record your observations. **REQUIRED**

**REQUIRED PHOTO 2: Show the egg after sitting in corn syrup (or honey or a saturated sugar solution) for 1 day. The shape of the egg should clearly be visible in the photo. Also visible – Today's date shown on a calendar, newspaper, or phone, or written on a sheet of paper, and Picture I.D. (with name).**

4. Remove the egg from the corn syrup, rinse it with water, and place it in a bowl of water. Allow the egg to sit for about 1 day. Record your observations.

Name \_\_\_\_\_

Lab Section \_\_\_\_\_

### PRELAB QUESTIONS

1. What is osmosis?
2. Predict what will happen to the egg when it is placed in the vinegar.
3. Predict what will happen to the egg when it is placed in the corn syrup.
4. Predict what will happen to the egg when it is placed in the water.
5. Which safety precautions, if any, must be observed during this experiment?



Name \_\_\_\_\_

Lab Section \_\_\_\_\_

## DATA

## POSTLAB QUESTIONS

1. What function does the vinegar serve?
2. What happened to the egg when placed in corn syrup? Explain why, using osmosis.
3. What happened to the egg when placed in water? Explain why.

4. Using the term *osmosis* and explaining the movement of *water*, answer the following:
- Explain why flowers are kept in water after they are cut.
  - Predict what would happen to raisins placed into water over a period of a couple days.
  - Explain what happens to cucumbers after they are placed into a concentrated salt solution for several weeks, as they are when canned.
5. What happens to red blood cells placed in a concentrated salt solution? What happens to red blood cells placed in water? What happens to red blood cells placed in an isotonic solution?

**PHOTO 1** - Please compress photos and save your file **before** uploading to the dropbox. Photos should come close to filling the box below and all required items should be **clearly visible**.  
[Consult the procedure for the required photo.](#)

Required Photo 1:



**PHOTO 2** - Please compress photos and save your file **before** uploading to the dropbox. Photos should come close to filling the box below and all required items should be **clearly visible**. Consult the procedure for the required photo.

Required Photo 2:

