NEW & IMPROVED 😊: EGG-SPERIMENT (Egg-Cell Osmosis)

Mr. Galloway

FILE: LS-Egg-Experiment-Osmosis-Galloway

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BACKGROUND: During this scientific experiment, you will determine whether solutions of different concentrations are hypotonic, isotonic, or hypertonic compared to the solution inside of a chicken egg/cell. If the solution outside the egg/cell is hypotonic then the solution inside the egg/cell is hypertonic by comparison (and vice/versa).

HYPOTONIC = solution with LESS dissolved substances.

HYPTERTONIC = solution with MORE dissolved substances.

ISOTONIC = solution with EQUAL amount.

Water molecules will diffuse (osmosis) from mostly from the hypotonic side of a membrane to the hypertonic side. Mr. Galloway will soak the eggs in vinegar for a few days. This will remove calcium from the shell. This allows the egg to act as a single cell surrounded by a selectively permeable membrane. This allows molecules in solution to move across the membrane.

MATERIALS

- vinegar-soaked chicken eggs
- water (sink to rinse eggs)
- gram scale
- clear disposable plastic cups
- 5 cm masking tape
- marker
- 500-mL beaker
- 50% Glucose solution
- 0% solution (Distilled Water)
- plastic wrap
- rubber bands

PROBLEM (Question): Are the tested solutions hypotonic, isotonic, or hypertonic to the egg?

HYPOTHESIS: (testable prediction) IF _____, THEN _____

PURPOSE:

1. You will test (compare) **TWO SOLUTIONS**: one is **DISTILLED** water and the other is a **50% GLUCOSE** solution. You will determine whether each is hypotonic, isotonic, or hypertonic relative to the inside of a chicken egg.
2. Identify the **VARIABLES** you will measure and the constants you will maintain during the investigation. Examples of constants include the amount of solution used for each egg.

CONSTANTS = _____

INDEPENDENT Variable = _____

DEPENDENT Variable = _____

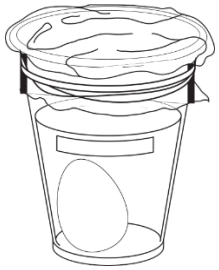
PROCEDURES

1. **SOAK** your group's egg in **VINEGAR** for 2-4 days, until the shell is dissolved off it.
    * Note any **CHANGES** in **APPEARANCE**.

GLUCOSE WATER TEST:

2. **WEIGH** an **EMPTY** cup (to determine its **MASS** in grams). **WRITE** this number down for later use.
    * Remember that **MASS** is a measure of the amount of **MATTER**. But **WEIGHT** is the pull of **GRAVITY** on it.
    * Later, you will use this **NJMBER** to determine **ONLY** the egg's mass when you weigh it inside of a cup.
3. **RINSE** your group's egg and **WEIGH** it inside of a plastic cup.
4. **SUBTRACT** the previous **MASS** of an EMPTY **CUP** to determine **ONLY** the **MASS** of the **EGG ALONE**.
5. **RECORD** this **INITIAL** (starting) mass in the table below.
    * **USE** the data **TABLE** on a following page to organize your results.
6. **LABEL** this cup with **CLASS PERIOD** & your **GROUP'S NUMBER**, & as **50% GLUCOSE SOLUTION**.
7. **POUR GLUCOSE** solution into the cup until it **COVERS** the egg so that it **FLOATS** in the solution.
8. **SOAK** your egg in this **GLUCOSE** solution for 1-2 days.

50% GLUCOSE Solution →

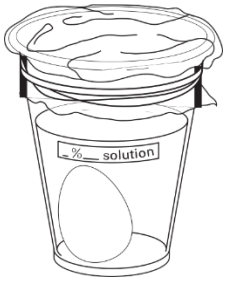


9. After 1-2 days, **REMOVE & DRY** (*GENTLY*) your group's egg. Note any changes in **APPEARANCE**.
10. **WEIGH** (determine the MASS) your egg inside of a **NEW CLEAN DRY** plastic **CUP**.
11. **SUBTRACT** the previous **MASS** of an *EMPTY* **CUP** to determine **ONLY** the **MASS** of the **EGG ALONE**.
12. **RECORD** this **FINAL** (starting) mass in the table below.
    * **USE** the data **TABLE** on the next page to organize your results.

DISTILLED WATER TEST:

13. **LABEL** this cup with your **CLASS PERIOD** & your **GROUP'S NUMBER**, & as **DISTILLED WATER SOLUTION**.
14. **POUR** the **DISTILLED** solution into the cup until it **COVERS** the egg. It will NOT FLOAT in this solution.

15. In 1-2 days, **REMOVE** each egg and **GENTLY** dry it. Note any changes in **APPEARANCE**.
16. **WEIGH** (determine the MASS) your egg inside of a **NEW CLEAN DRY** plastic **CUP**.
17. **SUBTRACT** previous **MASS** of an *EMPTY* **CUP** to determine **ONLY** the **MASS** of the **EGG ALONE**.
18. **RECORD** this **FINAL** (starting) mass after it soaked in **DISTILLED** water solution.
    * **USE** the data **TABLE** on the next page to organize your results.



0% Solution (Distilled Water)

TABLE 1. CHANGES IN EGG MASS		
	50 % Solution (GLUCOSE)	**0 % Solution (DISTILLED)**
INITIAL egg mass (grams - g)		
FINAL egg mass after soaking in solution (g)		
CHANGE in mass **= INITIAL** mass **MINUS** the **FINAL** mass		
CHANGES in egg **APPEARANCE**		

ANALYZE AND CONCLUDE:

1. How can you determine whether a solution you tested was hypotonic, isotonic, or hypertonic?

2. Which solution made the egg swell or look bigger? _____
3. Which solution made the egg shrink or look smaller? _____

4. Which solution caused the egg to GAIN mass? _____, LOSE mass _____.

5. Which solution was hypotonic? _____, isotonic _____, hypertonic _____.

6. Experimental Design Evaluation: List possible reasons for inconsistent results you may have observed.

* LATER, you will **WRITE**
a formal **LAB REPORT**
summarizing your experiment
and communicating your conclusions.

It will be a SEPARATE assignment.
That LAB REPORT will be a TEST GRADE!