**Lab 1-3: EGG Osmosis Name:**

 **Date:**

**Block:**

**Purpose**:

***An explanation of what the purpose of your experiment is and what you hoped to achieve.***

Ex.

To investigate the concepts of osmosis and diffusion using eggs submersed in a variety of substances.

**Hypothesis:**

***Write a formal hypothesis that explains the predicted result of the experiment. Identify the independent variable, dependent variable and controlled variables.(Use the*** *“If”* ***and*** *“Then”* ***format for writing a hypothesis).***

Ex.

*“If”* ***diffusion and osmosis across a selectively permeable membrane*** are related to ***the substance the membrane is submersed in***, *“then”* an egg submersed in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will \_\_\_\_\_\_\_\_\_\_\_\_\_ as a result of the diffusion of water (osmosis) \_\_\_\_\_\_\_\_\_\_\_ the egg.

 **Independent variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Dependent variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Controlled variables**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Materials**:

***Provide a comprehensive list. Include the quantity or amount of each material.***

* 2 eggs
* 150 mL white vinegar
* 3- 250 mL beakers
* 150 mL water or

150 mL \_\_\_ water

* 150 mL \_\_\_\_\_\_\_\_
* digital scale
* tape

**Procedure**:

***As a list of steps, describe in clear detail the methodology used to collect data or make your observations/discoveries. Include enough information for someone to repeat the experiment.***

Ex.

1. Place 2 eggs into the same 250 mL beakers. Cover the eggs with 150 mL of vinegar. Refrigerate for 24 hours.
2. After 24 hours have elapsed, carefully remove the eggs from the beaker. Observe the egg's appearance. Record it in Data Table 1.
3. Measure the mass of each egg and record it in Data Table 2.
4. Pour 150 ml of plain water or \_\_\_\_\_\_\_ water and \_\_\_\_\_\_\_\_\_\_\_ into its own beaker. Label each beaker. Record the volume for each substance in Data Table 3.
5. Place Egg 1 into the beaker with plain water or with \_\_\_\_\_ water and Egg 2 into the beaker with \_\_\_\_\_\_\_\_\_\_.
6. Refrigerate for 24 hours.
7. After 24 hours, remove the eggs from the beakers.
8. Observe the appearance of each egg and record it in Data Table 1.
9. Measure the mass of each egg and record it in Data Table 2.
10. Measure the volume of liquid left over in the beaker and record in Data Table 3.
11. Use a toothpick to carefully pop the egg membrane and record their observations in Data Table 1. (Be sure to have paper towels handy as some eggs may squirt!)

**Data/Observations/Results:**

**Present honest and clear results. Tables and graphs should be used wherever possible.**

**Data Table 1: Appearance of Eggs Before and After Being Submerged in**

**Different Substances**

|  |  |  |  |
| --- | --- | --- | --- |
| **Egg** | **Appearance Before Being Submerged in Different Substances** | **Appearance After Being Submerged in Different Substances** | **Appearance of the Inside of the Egg After Being Submerged in Different Substances** |
| **1****(Plain Water or \_\_\_\_ Water)** |  |  |  |
| **2****(\_\_\_\_\_\_\_\_\_)** |  |  |  |

**Data Table 2: Mass of Eggs Before and After Being Submerged in**

**Different Substances**

|  |  |  |
| --- | --- | --- |
| **Egg** | **Mass Before Being Submerged in Different Substances****(g)** | **Mass After Being Submerged in Different Substances****(g)** |
| **(Plain Water or \_\_\_\_ Water)** |  |  |
| **2****(\_\_\_\_\_\_\_\_\_)** |  |  |

**Data Table 3: Volume of Liquid in the Beakers for Eggs Before and After Being**

**Submerged in Different Substances**

|  |  |  |
| --- | --- | --- |
| **Egg** | **Volume of Liquid in Beaker Before Egg Submerged in Different Substances****(mL)** | **Volume of Liquid in Beaker After Egg Submerged in Different Substances****(mL)** |
| **1****(Plain Water or \_\_\_\_ Water)** |  |  |
| **2****(\_\_\_\_\_\_\_\_\_)** |  |  |

**Graphs**

Use Excel to create two bar graphs:

* Substance vs. Mass After Being Submerged in Different Substances
* Substance vs. Volume of Liquid in Beaker After Egg Submerged in Different Substances (mL)

**Discussion:**

Thoroughly discuss exactly what you did in your project. Your results should be compared with theoretical values, published data, commonly held beliefs and/or expected results. A discussion of possible errors should be included as well as how the data varied between repeated observations, how your results were affected by uncontrolled events, what you would do differently if you repeated the project, and what other experiments should be conducted. Your research work must be included in this section.

**The four steps to writing a successful discussion:**

Begin with:

1. **“In my hypothesis……….”**
* Was it correct or incorrect?
* Discuss your predictions compared to the outcome of your experiment.
* Include your background research here.

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1. **Discussion of your procedures, variables and controls**
* Explain what you did and why.
* Convince the reader/marker that all the variables were considered, identified and controlled.
* Remember – if certain variables are overlooked or not properly controlled, it could invalidate the experiment.
* Review correct usage of terms: independent variable, dependent variable, and controlled variables.

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1. **Discussion of your results**

Using your data, describe the difference between what happened to the egg when you put it in the various substances. Did the mass of the eggs change? Did the volume of liquid in the beaker change? If so, explain why?

* For example: explain a graph, diagrams, scientific principles, etc.
* The discussion should attempt, in detail, to explain the outcome of the experiment based upon data/results gathered during experimentation.
* Results compared with theoretical values or expected results.

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1. **Reflection on experimentation**
* Was the experiment valid/successful?
* What would you change?
* Any problems identified? Possible sources of error?
* Extension: If you repeated the project, what else could you test?

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**Conclusion:**

***A summary of your results relating them to your hypothesis. Refer to the results of your experiment in the formulation of your conclusion.***

How did this experiment demonstrate the process of osmosis? Explain your answer using your observations from this activity. Was your hypothesis supported or not? Include reference to your data, and the independent, dependent and controlled variables.

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 **LAB 1-3: EGG OSMOSIS NAMES:\_\_\_\_\_\_\_\_\_\_\_\_**

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 **\_\_\_\_\_\_\_\_\_\_\_\_**

 **\_\_\_\_\_\_\_\_\_\_\_\_**

 **\_\_\_\_\_\_\_\_\_\_\_\_**

**SELF ASSESSMENT RUBRIC**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **3** | **2** | **1** |
| **PURPOSE / MATERIALS/****PROCEDURE** | Format is correct. All present and typed. Headings are underlined. | All/ most present and typed. | Some are present and typed or most are missing. |
| **HYPOTHESIS** | Correct format using “”If/Then” statement. Hypothesis is logical and makes a clear, testable prediction.Variables are listed and accurate. | Correct format using “”If/Then” statement. Hypothesis is logical and makes a clear, testable prediction.Variables are listed. |  “”If/Then” statement is not entirely correct or not used/given. A clear, testable situation may not be established. Variable are not listed.  |
| **DATA/OBSERVATIONS/ RESULTS/ GRAPHS** | Data tables are accurate, neat, and complete. Graphs are correct and done by Excel. Each has an accurate title. Heading is underlined. | Data tables are neat, and complete. Graphs are done by Excel.  | Data tables and/or graph are incomplete or missing. |
|  |  **9-10** |  **6-8** |  **3-5** |  **1-2** |
| **Discussion** | Discussion neatly and accurately explains the results above. Results are included. Detailed discussion is evident in four paragraphs are used. Critical thought is evident in application. Headings are underlined. | Conclusion explains the results above. Four paragraphs are used. Some critical thought is evident in application.  | Conclusion is stated but lacks detail. Two to three of the steps for success are addressed. Little critical thought evident. | Conclusion is incomplete. The steps for success are not addressed. Little critical thought evident. |
|  |  **3** |  **2** |  **1** |
| **SAFETY, SKILL & CLEAN-UP** | Student is on task and follows procedures safely. Materials are cleaned up and disposed of as teacher instructed. | Some reminders needed to be on task and follow procedures safely. Materials are cleaned up and disposed of with some reminders.  | Many reminders needed to be on task and follow procedures safely. Materials are cleaned up and disposed of, with many reminders.  |
| **CONCLUSION** | Conclusion neatly and accurately answers the questions in full, complete sentences using dark, blue or black ink or pencil. | Conclusion answers the questions, using dark, blue or black ink/or pencil. | Conclusion stated but does not answer the question. |
|  |  **5** |  **4** |  **3** |  **1-2** |
| **Weebly Portfolio****Presentation** | All steps of the lab are clearly presented. Correct individual scientific method tabs are used. A concerted effort is made to enhance the overall visual presentation of the lab. (i.e. – photos, video, hyperlinks, buttons, etc.) | Most steps of the lab are presented. Most individual scientific method tabs are used. The overall visual presentation of the lab is basic but acceptable. | Some steps of the lab are presented properly or as required. The overall visual presentation of the lab is basic to poor. More effort and creativity is required. | Not all steps of the lab are presented properly or as required. Instructions have not been followed. The overall visual presentation of the lab is poor. More effort and creativity is required. |

 **TOTAL: /30**

**LAB 1-3: EGG OSMOSIS NAMES:\_\_\_\_\_\_\_\_\_\_\_\_**

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**TEACHER ASSESSMENT RUBRIC**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **3** | **2** | **1** |
| **PURPOSE / MATERIALS/****PROCEDURE** | Format is correct. All present and typed. Headings are underlined. | All/ most present and typed. | Some are present and typed or most are missing. |
| **HYPOTHESIS** | Correct format using “”If/Then” statement. Hypothesis is logical and makes a clear, testable prediction.Variables are listed and accurate. | Correct format using “”If/Then” statement. Hypothesis is logical and makes a clear, testable prediction.Variables are listed. |  “”If/Then” statement is not entirely correct or not used/given. A clear, testable situation may not be established. Variable are not listed.  |
| **DATA/OBSERVATIONS/ RESULTS/ GRAPHS** | Data tables are accurate, neat, and complete. Graphs are correct and done by Excel. Each has an accurate title. Heading is underlined. | Data tables are neat, and complete. Graphs are done by Excel.  | Data tables and/or graph are incomplete or missing. |
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|  |  **3** |  **2** |  **1** |
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**TOTAL: /30**