**IB Foundation Years (9 & 10) Lab Report**

**1) Writing a fully focused research question**

o Must include the range of the independent variable with units

o Must include the dependent variable

o Method of measuring the dependent variable

what is the effect of changing the temperature(0,25,40) on the permeability of the membrane measured by the absorption of the colory meter?

1. **Scientific background** 
   * Research your independent variable
   * Research its effect on your dependent variable
   * Research the method of measuring the dependent variable
   * Include citation

The independent variable is the temperature. The independent variable (temperature) affected the dependent variable in a way that as the temperature decreases the dependent variable (permeability of the membrane) increases.

1. **Hypothesis:** Outline a hypothesis to predict the outcome of the experiment and

explain it using logical scientific *reasoning (what do you think is going to happen*

As the temperature increases

(State the IV) (increase, decrease, or change)

then the absorption of the dye will increase

(State the DV) (increase, decrease, stay the same, or change)

**Scientific explanation for hypothesis (**This is the explanation to the previous hypothesis. Why do you think that your hypothesis is correct? Explain it in detail with reasons and causes. You may also find research at this point if allowed).

Because: As temperatures increase, the phospholipids' kinetic energy also increases, which increases their movement. This increase in movement leads to an increase in the permeability of the membrane.

1. **Manipulating the variables:**

**What is your independent variable?**

* What are the units?
* How will it be changed stating the instruments that you will be using
* Will you be doing a control experiment?
* Why did you choose this range?

**Discuss your dependent variable [ the method of measurements + units+ time frame]**

|  |  |  |
| --- | --- | --- |
| **Controlled Variable** | **How will you keep this controlled? Stating the values and the equipment that you will be using** | **How could it affect your results if not controlled?** |
| Amount of water | By using a measuring cylinder | It will affect the change of color in the water because as the amount of water changes the absorption will also change |
| Colory meter | Using the same colory meter | Some colory meters are different, so they may give different results about the absorption. |
| Time | By using timer | If the time in one test tube is more than the other it will absorb more dye |

1. **Materials and Method**:

State your materials [ number needed + units] (Be descriptive, example: 10cm3 graduated cylinder) include the uncertainties for each piece of apparatus

Materials:

1. Fresh beetroots

2. Scalpel or knife

3. Distilled water

4. Test tubes

5. Beaker

6. Timer

7. Cork borer

8. Cutting board

**Method: What are the steps of the investigation?**

o State step by step your method [ must be clear and easy to follow]

o **Draw and annotate a diagram or add an annotated photo in the space (**This annotated (labeled) diagram of your equipment set up.

o State the number of trials per increment of the independent variable

1. Beetroots were obtained and washed to remove any surface impurities
2. Using a cork borer, discs of beetroots were obtained
3. The beetroots were then rinsed with distilled water
4. 3 test tubes were then labeled and filled with 10 ml of distilled water each
5. The first test tube was kept at room temperature(25c)
6. Other test tubes were placed in water baths at different temperatures(0c,45c)
7. The test tubes were left undistributed for 5 minutes
8. After 5 minutes the beetroot discs were removed from the test tubes
9. The absorbance of the liquid in each test tube was measured using a colory meter
10. The absorbance readings were recorded
11. **Safety, Ethical and Environmental issues**
12. Never run in a laboratory
13. Immediately report any spells, accidents, or injuries to a teacher
14. Wear lab PPT coat gloves or an apron are worn to escape injuries or accidents during the usage of chemicals in the laboratory
15. Eat or drinking is prohibited due to the reason food being able to touch chemicals that injuries health
16. No animals were used or harmed
17. Did not affect the environment in any way
18. **Results**

**Add a table for qualitative results e.g. Variation within the organism/biological material being are dealt with; Color, texture, shape, size, heat changes; Anything you notice that might affect results.**

**Qualitative information:**

|  |  |
| --- | --- |
| Temperature in degrees | Absorbance in AU |
| 0 | 0.49 |
| 25 | 0.45 |
| 40 | 0.46 |

**Table 1.4 shows the obserbtion with different temperatures**

**Raw Data**

* Construct a table to add your raw data , add a fully detailed title to your table .
* Label your table ( table 1, table 2…)
* Add suitable headings with units and uncertainties to your table.
* Unify your decimal points

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  |  | | --- | --- | | 0 degrees | Brighter color shade | | 25 degrees | Regular color shade | | 45 degrees | Darker color shade |  |  |  |  |  | | --- | --- | --- | --- | | Trails | Experiment 1  (25 degrees) | Experiment 2  (0 degrees) | Experiment 3  40 degrees | | 1 | 0.45 | 0.49 | 0.46 | | 2 | 0.46 | 0.48 | 0.47 | | 3 | 0.45 | 0.50 | 0.47 | | average | 0.45 | 0.48 | 0.47 |   Table 1.5 shows the amount of dye absorbed in different tempretures  **Processed data**   * Justify the reason for data processing * Add screenshots from excel to provide evidence for your work, or provide a sample calculation * Construct a table to add your results * Add a title for your table and label it * Unify your decimal points   As the temperature increases so does the color absorbance value, |