The National Orthodox School Shmaisani

IB Foundation Years (9 & 10) Lab Report

1) Writing a fully focused research question

- Must include the range of the independent variable with units
- Must include the dependent variable
- Method of measuring the dependent variable

What is the effect of **tempreature** (25,37,70 celsius) on the rate of the reaction catalyzed by enzyme (enzyme activity) measured by volume of gas connected in the tube (cm^3) on 3 trials for each temperature, this will be done by meaauring the voluime of gas produced using a measuring tube

2) Scientific background

- Research your independent variable
- Research its effect on your dependent variable
- Research the method of measuring the dependent variable
- Include citation

> **As the temperature increases so does the rate of enzyme activity**. Optimal activity is achieved at the optimum temperature for the enzyme. As the temperature continues to rise, the shape of the enzyme's active center changes, resulting in a sharp drop-in activity. As with many chemical reactions, the rate of enzyme-catalyzed reactions increases with increasing temperature. At higher temperatures, however, the rate slows down again as the enzyme reaches its optimum temperature, denatures, and becomes incapable of functioning.

The method of measuring the dependent variable (volume) while changing the independent variable (temperature) is counting the bubbles produced (gas) in one minute

3) 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, the amount of gas produced increases, up to a certain point where the enzyme reaches its optimum temperature, the enzyme denatures and the amount of gas begins to decrease.

Enzyme yeast sugar

Scientific explanation for hypothesis (This is the explanation to the previous hypothesis. Why do you

Citations/References:

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 the temperature increases, the kinetic energy of the gas molecules increases, and their velocity also increases. Also, their intermolecular forces weaken, resulting in the expansion of spaces between the molecules, which in turn leads to an increase in the volume, it increases until it reaches the optimum then it decreases

4) 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]

Degree cilcius/cm3
The 37c is the control
We chose 25-70 because 70 is the optimum of the reactivity of the catalase and 25 because it was the room Temperature
the enzyme activity changes with the variables

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?**
Temperature of water	We will control the temperature of the water using a water bath	won't be able to record a precise result, as we won't have a specific temperature
Amount of catalyst used	Measuring the exact same amount of catalys for all trials	It will affect the results (un accurate)
Type of catalase	same type of the catalase for all trials	It will affect the results (un accurate)

Commented [M1]: Write more details

5) Materials and Method:

State your materials [number needed + units] (Be descriptive, example: 10cm^3 graduated cylinder) include the uncertainties for each piece of apparatus

Method: What are the steps of the investigation?

- State step by step your method [must be clear and easy to follow]
- **Draw and annotate a diagram or add an annotated photo in the space (** This annotated (labeled) diagram of your equipment set up.
- State the number of trials per increment of the independent variable

MEASURMENTS:

1 plate
1 conical flask ()
1 water bath (25c,70c,37c)
1 rubber tube
These are the materials for only 1 trial

6) Safety, Ethical and Environmental issues

Safety:

1) Handling hydrogen peroxide carefully by using gloves

2) Care taken with glass so it doesn't get broken

Environmental:

1)disposing of hydrogen peroxide carefully down the sink without splashing

7) 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.

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

Temperature (c)	Trial 1 (volume of gas collected)	Trial 2 (volume of gas collected)	Trial 3 (volume of gas collected)
25	20	21	20
37	63	61	65
70	5	3	0

Commented [M2]: Label your table / on the headings write the measuring units

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

Temperature	Trial 1	Trial 2	Trial 3
25			
37			
70			