



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** what range will you be using **25c and 37c and 70c** on the **rate of reactivity of the catalase enzyme** measured by **volume of gas collected in the tube and the unit is cm³**(write the method and the units)-----?

2) Scientific background

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

The rate of enzyme activity rises along with the temperature.

The enzyme's optimum temperature results in maximum action.

As with many chemical reactions, the rate of an enzyme-

catalyzed reaction rises with temperature, which causes a sharp decrease in activity as the active site of the enzyme changes shape.

However, at elevated temperatures, the rate declines once more as a result of the enzyme's denaturation and loss of functionality.

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*)

If the temperature **Increases**

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

Citations/References:

then the rate of reactivity will increase until it reaches the optimum temperature then it denatures and starts to decrease

(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 the temperature increases the catalase enzyme reactivity will increase because as we heat it it will gain more energy and if more energy was found they will react faster until they reach a certain point which is called the optimum the enzyme will denature this means that it will lose the energy that was gained because it reached its maximum point of reactivity.

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 Celsius/cm³

The 37°C 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?
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Amount of catalyst	Measure the volume of catalase added or use the same spatula	It will affect the results and it will change them
Amount of hydrogen peroxide	Calculate the volume of empty area in the measuring cilender	It will affect results and it will change them
Type of catalase	Use the same catalase for all experiments	It will affect the results and it will change them

Commented [M1]: More details please in the last column

5) Materials and Method:

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

Measuring celinder to the maximum

Conical flask

A round plate that has a whole in it

A rubber tube

Water bath heat one to 25c,37c,70c

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. Measure five (15)ml samples of yeast powder once more.
2. Measure (15) cm' of (10)mlVol hydrogen peroxide into five separate boiling tubes.

3. Label each tube; (25/37/70)C and put each boiling tube into a water bath for (5)minutes. Check the temperature with a thermometer.
4. Set up the inverted measuring cylinder as before.
5. Add the (____)to the first boiling tube and quickly connect the tube to the rest of the apparatus.
6. After just (1) seconds, record the volume of oxygen.
7. Repeat for each of the (3) temperatures of hydrogen peroxide.

6) Safety, Ethical and Environmental issues

We did not use anything no animals were used or harmed and no pollution was caused

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.

Observation table.

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Commented [M2]: Qualitative data is missing

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

Temp Celsius	Trial1	Trial 2	Trial 3
25	20	21	20
37	63	61	65
70	5	3	0

Commented [M3]: Table 1 must be written below the table

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

Table 2

Temp	Trial1	Trial2	Trial3	Average
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25 20.0 21.0 20.0 20.333
37 63.0 61.0 65.0 63

Commented [M4]: Show the headings more clear

The rate of enzyme activity grows as the temperature rises.
With rising temperatures, enzyme activity also rises more quickly.
The temperature at which the enzyme is most active is optimum.
The structure of the enzyme's active site changes as the temperature increases, drastically decreasing the activity.
And this backs up my assertion.