



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 changing the temperature from the range 25c and 37c and 70c on the rate of reactivity of the catalase enzyme measured by volume of gas collected in the tube in cm³

2) Scientific background

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

1. The rate of enzyme activity rises along with the temperature.
2. The enzyme's optimum temperature results in maximum action.
3. 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.
- 4.

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 is raised, the rate of reactivity increases until it reaches the optimum temperature, at which point it denatures and begins to decrease.

OBJ:

(increase, decrease, or change)

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

Citations/References:

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 we heat it, it gains more energy, and if more energy is found, they will react faster until they reach a certain point known as the optimum, at which point the enzyme will denature, which means it will lose the energy gained because it reached its maximum point of reactivity, and the reactivity begins to deplete. 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 37c is the control

We choose 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?
Time in water	Using a stopwatch leave the catalase enzyme in a specific amount of time	It will affect the results and it will change them
Volume of catalyst	Measure the volume of catalase added or use the same spatula	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

Table1

4) Materials and Method:

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

Measuring cylinder to the maximum
Conical flask

A round plate that has a whole in it

A rubber tubes

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

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

1. Measure five (15) ml samples of yeast powder once more.
2. Measure (15) cm³ 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) second, record the volume of oxygen.
7. Repeat for each of the (3) temperatures of hydrogen peroxide.

5) **Safety, Ethical and Environmental issues**

NO ANIMALS WERE HARMED/USED

6) 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

TABLE 2	Volume of oxygen ml		
Temp Celsius	Trial1	Trial 2	Trial 3
25	20	21	20
37	63	61	65
70	5	3	0

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

Temp	Trial1	Trial2	Trial3	Average
25	20.0	21.0	20.0	20.333
37	63.0	61.0	65.0	63
70	5.0	3.0	0.0	2.7

Table 3

To ensure reliability we repeated the test and calculated average

The rate of enzyme activity increases as the temperature rises. The rate of enzyme activity increases as the temperature rises. The optimal temperature of the enzyme results in maximum activity. The structure of the enzyme's active site changes as the temperature rises, resulting in a significant decrease in activity. And this gives credibility to my hypothesis.