



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 of water(IV) (room temperature, 37 C, 70 C) on the amount of gas produced measured by milliliters. (place yeast in 3 different temperature, measure amount of co2 given out into the flipped measuring cylinder that is connected to the yeast flask.)

Commented [M1]: Measuring unit of gas and how to measure it .

2) Scientific background

The Independent variable is the temperature. Different enzymes have different optimum temperatures, so as the temperature increases or decreases from 37 C, it will most likely denature. We will be measuring the effect of different temperatures on enzymes by placing enzymes in 3 different temperature bowls of water and allowing them to conduct a reaction which releases CO₂, and we will measure the amount of gas that is produced through the reading of water on the measuring cylinder which will decrease.

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)

Is reached then it decreases gradually

then the amount of gas produced will increase until the optimum temperature for the enzyme is reached\.

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

Citations/References:

Scientific explanation for hypothesis: the gas production will increase with the increase of temperature in direct proportion. After the enzyme reaches its optimum temperature it will denature and no longer function properly, therefore the reaction will gradually decrease.

Because:

4) Manipulating the variables:

What is your independent variable ?

Temperature of water, measured in degrees Celsius (C), it will increase and decrease through using an electronic heater or cooler, yes as there is a bowl of water filled with 37 degrees Celsius as that is the enzymes optimum heat to work at. That is the control. The range is to check how the dependent variables would change according to both a noticeable increase and decrease in the temperature of wwater.

- 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]

Cylinder holding water which will have a decrease in water amount because of gas displacing it, and we will measure the volume of the cylinder which is now filled with gas. We will give each enzyme about around 2 minutes to work, and then we'll measure the results.

Commented [M2]: Write more details in the 3rd column

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?
Volume of water in cylinder	Measuring the water with a measuring cylinder	Inaccurate reading
Mass of yeast	Top pan balance	Inaccurate readings and results
Volume of enzyme	Measuringg the amount of enzyme with measuring cylinder	Inaccurate reading

5) Materials and Method:

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

3 measuring cylinders 10cm³, 3 bowls of water, three flasks filled with enzyme, 3 spoons of sugar, tube, heater for water, tube inserting plate

Method : What are the steps of the investigation?

, heat 2 bowls to 37 degrees and 70 degrees. One at room temperature put the enzyme flask in the different waters, and then connect it via a tube into a flask from underwater, and allow the reaction to take place and displace the water in the tube. Finally observe results and write them down.

6) Safety, Ethical and Environmental issues

Caution with the flame as a chemical may be flammable

Safety glasses and gloves

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.

Qualitative differences at different temperatures.

	Qualitative Results		
Temperature (C)	25	37	70
Enzyme activity	Enzyme is active but not at optimum.	Optimum level, as this is the temperature of our body	Enzyme denatures

Commented [M3]: Arrange the information in different ways

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

Different volumes of oxygen produced at different temperatures

	Volume of oxygen produced (ml ³)		
Temperature (C)	Trial 1	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

The main reason of processing the data is to come up with final results on the rate and finally find an average rate of oxygen produced by the enzyme, that will be somewhat accurate and reliable after recording the volumes produced three times.

Finding the average rate of oxygen production

	Rate of reaction (ml ³ of oxygen /minute)			
Temperature (C)	Trial 1	Trial 2	Trial 3	Rate
25	20	21	20	20.3
37	63	61	65	147
70	5	3	0	2

