**STAGE 2 BIOLOGY**

**ASSESSMENT TYPE 1: Investigations Folio**

**Practical Investigation: Temperature affect on Lipase activity**

Purpose

This assessment provides opportunities for you to demonstrate your ability to:

* work collaboratively to conduct a well planned biological investigation in which you manipulate apparatus, obtain, record and display data and make appropriate observations
* display the findings appropriately and effectively
* systematically evaluate the data and observations from the investigation and form relevant conclusions.

Description of assessment

This is a ‘completion’ type practical in which you use the method provided.

You work in pairs to complete the practical but you need to individually record your results and write your report.

In your report, include:

* Abstract
* Introduction
* Materials and Method used
* Safety assessment
* Results obtained
* Data interpretation
* Evaluation and conclusion
* Review

as explained in the attachment.

The “Practical Skills Assessment” sheet must also be submitted with the report.

Assessment conditions

This assessment is conducted under direct supervision and assessment of skills in individual and collaborative work will be made during the practical. One lesson will be allowed for the practical part of this assessment and one lesson will be allowed to complete the report.

**Introduction:** *This investigation will allow students to explore the structure and function of an enzyme (lipase). Students will test the activity of the enzyme (the rate of reaction) at different temperature to hypothesise Lipase’s optimum conditions.*

**Aim:** To explore the affect of temperature on Lipase activity.

**Apparatus:**

* Test tube
* Pipette
* Lipase solution
* Full cream milk
* Sodium carbonate solution
* Phenolphthalein solution
* Thermometer
* Stopwatch
* Hot plates
* Water
* Beaker

**Method:**

1. In a test tube, add 7ml of Sodium Carbonate solution followed by 5 drops of Phenolphthalein
2. A pink colour should develop in the test tube, then add 5ml of full cream milk to the test tube
3. Gently mix together all the solutions in the test tube
4. Place a thermometer in the test tube
5. Place the test tube into the water bath set to a particular temperature and leave it until the temperature in the test tube matches the temperature of the water
6. Add 1ml of Lipase to the test tube and start the stopwatch.
7. When the test tube loses its pink colour and turns to a neutral/white colour, stop the stopwatch
8. Record in seconds how long it took for the contents in the test tube to change colour. Calculate reaction rate (1/secs).
9. Repeat this method at different temperatures
10. Record all results, collaborate with class members to achieve average and collate into a graph and table.

Safety Assessment

Every activity we do in life has a level of risk, from walking on the street to flying in a plane. It is your responsibility to critically analyse an experiment*before commencing* and identify hazards associated with each experiment and suggest safe operating procedures.

Examples of hazards may be:

Use of chemicals, biological specimens, electricity, heat/fire, tripping hazards, glass breakage, falling objects, lasers etc.

Examples of safe operating procedures may be:

Use of safety glasses/lab coats/aprons/closed toe shoes, awareness of safety blankets/fire extinguishers/eye wash/safety showers, one group member is designated as a safety officer and is responsible for ensuring procedures are followed, a verbal countdown to ensure that everyone knows that the test is commencing, the establishment of a safety zone, etc.

You need to provide an overall hazard assessment and then identify potential hazards and provide advice on the safe operating procedure to avoid the hazard from causing an issue in the laboratory.

Interpreting the Data

1. Given the above method, state a hypothesis relating to the effect of temperature on the amount of lipase activity.
2. Explain the colour change that occurred and reasons for this change.
3. Explain the affect that temperature had on reaction rate. Include cold, warm and hot temperatures. Why did this occur?
4. What does this tell you about enzymes in the human body?

Evaluation and Conclusion

Write a report, using appropriate and effective biological language, of this investigation in which you:

* evaluate the procedures used and suggest possible improvements
* discuss the reliability and possible sources of random and systematic errors in your data
* make a relevant conclusion based on your data.

Review

Write a short paragraph to review your own performance in this collaboration task. Consider the following: How well do you think you worked in the group? Was it collaborative or did one person do all the tasks? Have you learnt anything about working in a team situation through your involvement in this task?

***\*\* Note: You will also need to include an abstract, introduction and results in your report.***

**Abstract:** Will appear first in your report, but should be written last. This is a one-paragraph summary of your ENTIRE REPORT.

**Introduction:** Will appear second in your report. Gives the reader background information about the investigation. For example, what is an enzyme? What reactions do they control? What is reaction rate (related to your practical)? What are some factors that affect enzymes? What is the focus of this investigation?

**Results:** Include a table, graph and short description of results.