

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use Total Task 1



General Certificate of Education
Advanced Subsidiary Examination
June 2010

Biology

BIO3X/PM1

Unit 3X AS Externally Marked Practical Assignment Task Sheet 1

To be completed before Task Sheet 2.

For submission by 15 May 2010

For this paper you must have:

- a ruler with millimetre measurements
- a calculator.

Task 1

Introduction

Lactase is an enzyme. It breaks down lactose to glucose and galactose.

You are going to investigate the breakdown of lactose by recording the amount of glucose produced.

You will use glucose test strips to test for glucose. When a test strip is dipped into a solution of glucose, it changes colour. The colour change depends on the concentration of glucose in the solution.

The colour of the test strip can be compared to a colour chart to give a value for the concentration of glucose.

Glucose test strips do not give a positive reaction with any other substance.

In this task you are going to investigate how the breakdown of lactose can be followed using a glucose test strip.

Materials

You are provided with

- solution of lactase
- fresh milk
- buffer solution
- glucose test strips
- access to a glucose test strip colour chart
- access to a water bath at 30 °C
- thermometer
- a stop watch
- boiling tubes
- rack for boiling tubes
- syringes or pipettes to measure 2 cm³ and 10 cm³

You may ask your teacher for any other apparatus you need.

Outline method

Read the following instructions carefully before you start your investigation.

1. Put 10 cm³ of milk and 10 cm³ of buffer into one boiling tube.
2. Put 2 cm³ lactase into a second tube.
3. Put both tubes in a water bath and leave them for 3 minutes.
4. Add the lactase to the milk and buffer mixture.
5. Shake the mixture, return the tube to the water bath and start the stop watch.
6. Immediately dip a glucose test strip into the mixture and remove.
7. Wait **exactly 10 seconds** then compare the colour of the test strip with the colour chart.
8. Use the scale on the colour chart to record the concentration of glucose. It should be recorded as 0, 1, 2, or 3.
9. Repeat steps 6 to 8 every minute for 5 minutes with a new glucose test strip each time.
10. Record your results in the table.

Time / minutes	Amount of glucose present as colour scale value
0	
1	
2	
3	
4	
5	

Turn over ►

Questions on Task 1

Answer **all** questions in the spaces provided.

1 Suppose the temperature of the water you used decreased during your investigation. Explain how a decrease in temperature would affect the results in your table.

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(2 marks)

2 Some types of milk contain lactase. Give **one** reason why these types of milk would **not** be suitable in this task.

.....
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(1 mark)

3 (a) You used glucose test strips to measure the concentration of glucose in this task. You should keep some aspects of using the test strips constant to obtain reliable data. Give **two** ways in which you should standardise your technique.

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(2 marks)

(Extra space).....
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3 (b) You recorded the amount of glucose present as 0, 1, 2 or 3. Given a solution of glucose of concentration 1 mol dm^{-3} and distilled water, you could find the actual concentration of glucose which corresponded to amount 2 on your colour value scale. Describe how you would do this.

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(2 marks)

(Extra space).....
.....

4 Lactose is a reducing sugar. Use this information to explain why it is **not** appropriate to use Benedict's reagent to measure the breakdown of lactose.

.....
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(1 mark)

5 In the next part of the investigation you will measure the rate at which lactose is broken down under different conditions. Use the results in your table to suggest how you could measure the rate of breakdown of lactose.

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(2 marks)

(Extra space).....
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END OF TASK 1

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