

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use Total Task 1



General Certificate of Education
Advanced Subsidiary Examination
June 2013

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 2013

For this paper you must have:

- a ruler with millimetre measurements
- a calculator.

Task 1

Introduction

You are provided with a large block of agar which has been stained with cresol red dye. Cresol red is an indicator which is red in alkaline conditions and orange in acidic conditions. You will cut this block of agar into two different sized pieces to obtain one larger piece and one smaller piece. You will then drop these pieces into dilute hydrochloric acid and time how long it takes for each piece to change colour completely from red to orange.

Materials

You are provided with:

- a block of agar jelly stained with cresol red dye
- scalpel
- 100 cm³ beaker
- dilute hydrochloric acid
- white tile
- timer
- ruler with millimetre measurements
- forceps.

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

Method

Read these instructions carefully before you start your investigation.

1. Place the block of agar on the white tile. Making sure that the scalpel blade is vertical, cut the block to produce two cubes each measuring 10 mm × 10 mm × 10 mm. Keep one as your large piece of agar.
2. Cut the other cube in half to produce two smaller pieces, each measuring 10 mm × 10 mm × 5 mm. Keep one as your small piece of agar.
3. Stand the beaker on the white tile. Pour dilute hydrochloric acid into the beaker until it is half full.
4. Carefully place the large piece and one of the smaller pieces of agar into the beaker and start the timer. Make sure that the two pieces do **not** touch each other.
5. Observe the colour change as the acid penetrates the agar.
6. Time in seconds how long it takes each piece to change colour completely from red to orange and record your results in the table on page 3.

You must decide for yourself:

- when the pieces of agar have changed colour completely.

Recording your results

Complete the table.

Size of piece of agar / mm	Time for agar to completely change colour from red to orange / seconds
10 × 10 × 10	
10 × 10 × 5	

Turn over for the questions

Turn over ►

Questions on Task 1

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

- 1** You were told to cut your pieces of agar from the same block (steps 1 and 2). Suggest why this was important.

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(1 mark)

- 2** You did not add a fixed volume of acid to the beaker (step 3). Why was it **not** necessary to use a fixed volume of acid?

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(1 mark)

- 3 (a)** You were told to make sure that the pieces of agar did **not** touch each other when they were in the acid (step 4).

Explain why this was important.

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(1 mark)

- 3 (b)** During this time in the acid, the pieces of agar may have had one face in contact with the beaker which could have affected your results.

Suggest how the method could be modified to reduce this problem.

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(1 mark)

4 When you placed your pieces of agar in the acid (step 4), the indicator gradually changed colour from red to orange.
Explain why.

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(1 mark)

5 You investigated the effect of size on the difference in time taken for the pieces of agar to change colour from red to orange.

Explain your results.

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(2 marks)

7

END OF TASK 1

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