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For Examiner's Use Total EMPA mark	
Examiner's Initials	
Section	Mark
Task 1	
Task 2	
Section A	
Section B	
TOTAL EMPA MARK	



General Certificate of Education
Advanced Level Examination
June 2011

Biology

BIO6X

Unit 6X A2 Externally Marked Practical Assignment

For submission by 15 May 2011

For this paper you must have: <ul style="list-style-type: none"> Task Sheet 2, including your results and statistical calculations a ruler with millimetre measurements a calculator. 	Time allowed <ul style="list-style-type: none"> 1 hour 15 minutes
Instructions: <ul style="list-style-type: none"> Use black ink or black ball-point pen. Fill in the boxes at the top of this page. Answer all questions. You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages. Do all rough work in this book. Cross through any work you do not want to be marked. 	Information <ul style="list-style-type: none"> The marks for questions are shown in brackets. The maximum mark for this paper is 34. You will be marked on your ability to: <ul style="list-style-type: none"> organise information clearly use scientific terminology accurately.
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Section A

These questions relate to your investigation into turning behaviour of maggots.

Use your Task Sheet 2, your results and your statistical calculations to answer them.

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

- 7** What sample size did you use in your investigation? Give **two** reasons why you used this sample size.

Sample Size

1

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2

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(2 marks)

- 8** Did you use a maggot more than once in your investigation? Give a reason for your answer.

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(1 mark)

- 9** A student carried out an investigation similar to the one you carried out in Task 2. He obtained the following data.

Number of maggots that turned left after a forced right turn	Number of maggots that turned right after a forced right turn
15	1

He decided that the one maggot that turned right was an anomaly. Was he correct to do so? Explain your answer.

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(1 mark)

10 (a) What is a taxis?
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(1 mark)

10 (b) Describe how you could try to ensure that the response of the maggots in your investigation was **not** a taxis in response to light. Explain your answer.
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(2 marks)

11 Maggots detect the presence of food by its scent. Describe how you could use the maze to investigate whether maggots detect the scent of raw meat. You may assume that all confounding variables are controlled.
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(3 marks)

(Extra space)
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10

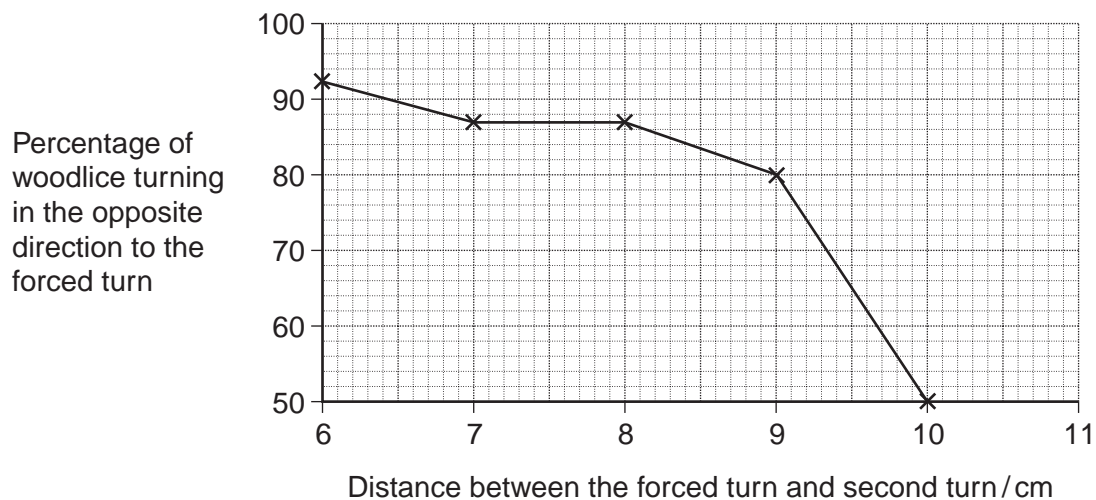
Turn over ►

Resource Sheet

Resource A

A student investigated the effect of distance from a forced turn on the direction woodlice turned when next given a choice. **Figure 3** shows her results.

Figure 3

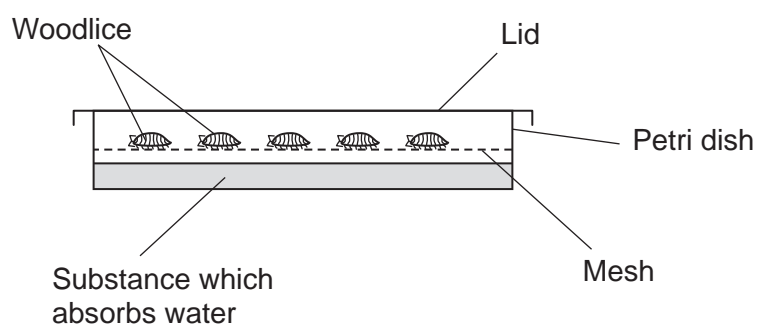


Resource B

Scientists investigated the effect of relative humidity on the activity of woodlice. They set up a Petri dish as shown in **Figure 4**.

In the bottom half they put a substance which absorbs water. Different concentrations of this substance produced different humidities in the air above the mesh.

Figure 4

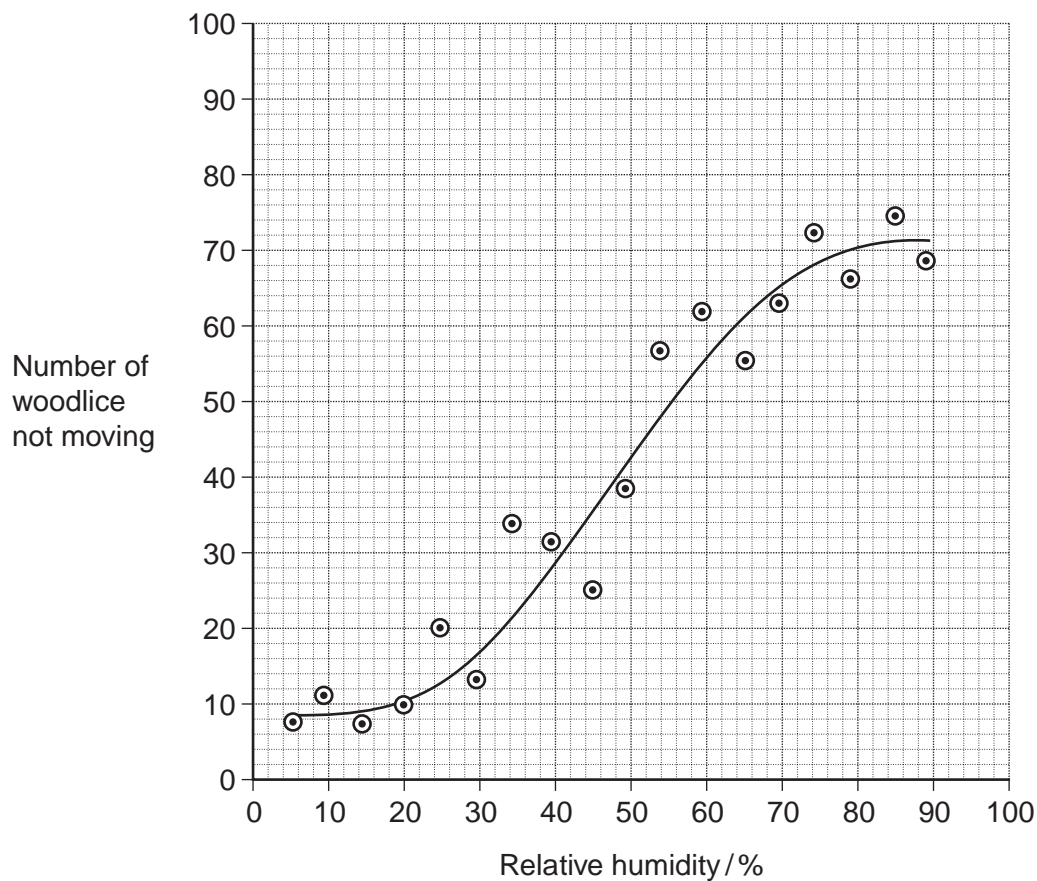


The scientists

- placed 10 woodlice in the top half of the dish
- replaced the lid and left the apparatus for 15 minutes in the laboratory
- recorded the number of woodlice **not** moving during the next 30 seconds
- repeated the experiment to obtain data for 100 woodlice
- repeated the experiment at different humidities.

The results are shown in **Figure 5**.

Figure 5



Turn over ►

Resource C

Woodlice use gills for gas exchange. These gills are situated on the outside of the animal so water loss occurs from the gill surface. When a number of woodlice occur together they often form a 'clump' with individual woodlice touching each other.

A student investigated the effect of clumping on the rate of water loss from the woodlice. The student divided the 12 woodlice into two groups. He allowed the woodlice in group **A** to clump together, but kept the woodlice in group **B** separate from each other.

Figure 6 shows the mean mass of the woodlice in each group.

Figure 6

Time / minutes	Mean mass of woodlice / g	
	Group A	Group B
0	0.180	0.175
20	0.170	0.130
40	0.165	0.110
60	0.160	0.090
80	0.160	0.080

Section B

Use the information in the **Resource Sheet** to answer the questions.

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

Use **Resource A** to answer Questions **12** to **15**.

12 Describe the response of woodlice to increased distance between turns.

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(2 marks)

13 Can you conclude that woodlice show turn alternation behaviour when the distance between the forced turn and the second turn was 10 cm? Explain your answer.

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(2 marks)

Turn over ►

14 The student suggested that the difference in turning behaviour of the woodlice in her investigation was due to the distance between the first and second turn. Her friend suggested that it was due to the time taken to get from the first to the second turn and **not** the distance. Suggest how you could investigate which of these two possibilities is more likely.

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(3 marks)

(Extra space)

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15 Woodlice usually live in areas where stones and twigs form obstacles. Obstacles in the path of woodlice cause them to make forced turns. The more obstacles there are in the path, the shorter the distance between the forced turns.

Use the data in **Figure 3** to explain how the behaviour of woodlice results in them moving rapidly out of unfavourable areas.

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(2 marks)

Use **Resource B** to answer Questions **16** to **18**.

16 The woodlice were left for 15 minutes before their movement was recorded. Give **two** reasons for this.

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(2 marks)

17 It is **not** possible to conclude that the change in the behaviour of the woodlice shown in **Figure 5** is caused by changes in humidity. Explain why.

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(2 marks)

18 The points in **Figure 5** do not all fall on the curve. Suggest why.

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(3 marks)

(Extra space)

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Turn over ►

Use **Resource C** to answer Question 19.

19 (a) Calculate the percentage loss in the mean mass of the woodlice in Group **A** during the investigation. Show your working.

Answer (2 marks)

19 (b) Woodlice in Group **B** had a greater percentage loss in mean mass during the investigation than woodlice in Group **A**. Explain why.

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..... (3 marks)

(Extra space)
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19 (c) It would be useful to give the loss in mean mass as a percentage in this investigation. Explain why.

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..... (1 mark)

20

The movement of the woodlice in low relative humidity is an advantage to their survival. Explain how.

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(2 marks)

24

END OF QUESTIONS

There are no questions printed on this page

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