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0610/63

October/November 2018

1 hour

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.

You may lose marks if you do not show your working or if you do not use appropriate units.

The number of marks is given in brackets [] at the end of each question or part question.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **10** printed pages and **2** blank pages.

- 1 Catalase is an enzyme found in plant and animal cells. It catalyses the break down of hydrogen peroxide to form water and oxygen.



The oxygen produced during the reaction forms a foam on the surface of the mixture of hydrogen peroxide and catalase. The height of the foam can be used as a measure of the activity of the catalase present.

A student investigated the effect of cooking on the activity of catalase in potato tissue using 3% hydrogen peroxide.

The student used the following method:

- Step 1 Cut two potato sticks so that they are identical in both shape and size.
- Step 2 Put 5 cm³ of hydrogen peroxide solution into a test-tube labelled **uncooked potato**.
- Step 3 Put 5 cm³ of hydrogen peroxide solution into a test-tube labelled **cooked potato**.
- Step 4 Put one of the potato sticks into a beaker of hot water (90 °C) and leave it for five minutes before carefully removing it.
- Step 5 Put the potato stick from step 4 into the test-tube labelled **cooked potato**.
- Step 6 Put the uncooked potato stick into the test-tube labelled **uncooked potato**.
- Step 7 Leave the potato sticks in the hydrogen peroxide for three minutes and then measure the height of the foam produced in each of the test-tubes.

Fig. 1.1 shows the test-tubes after three minutes.

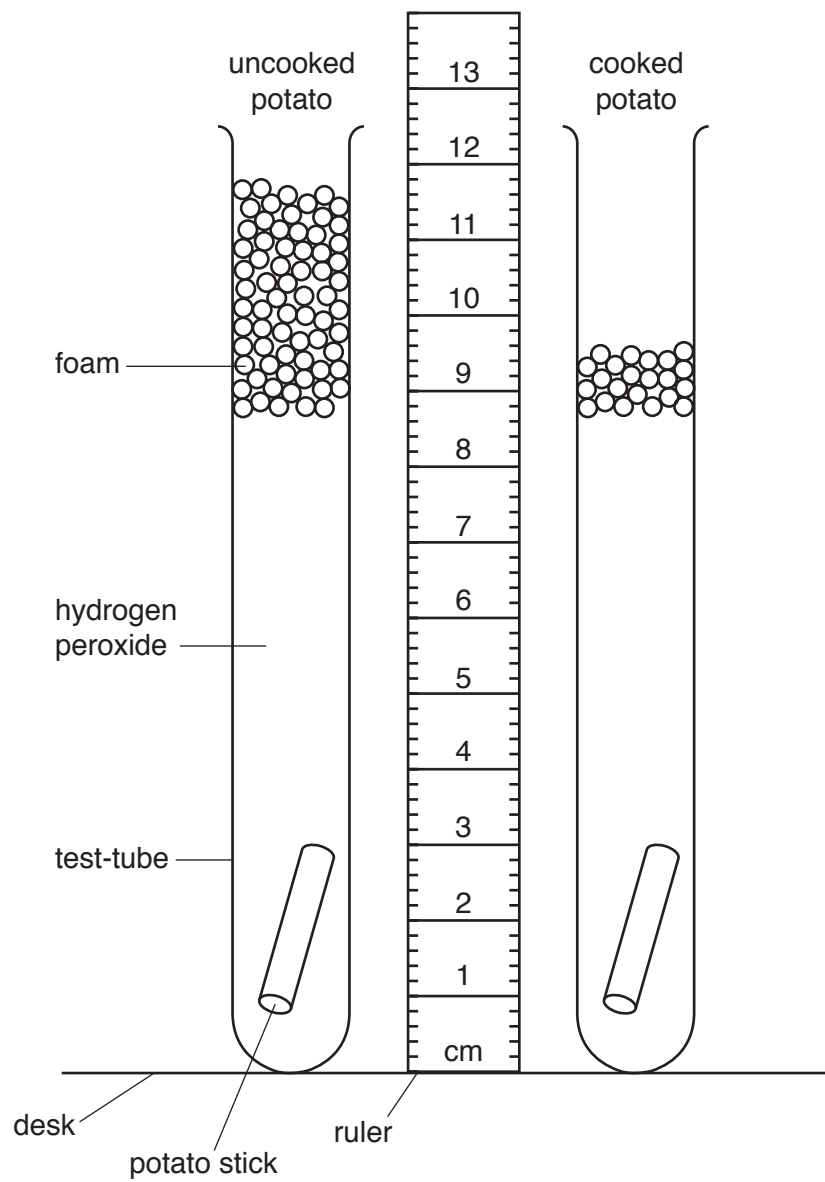


Fig. 1.1

- (a) (i)** Prepare a table for the student's results.

Measure the height of the foam in each of the test-tubes in Fig. 1.1. Record these values in your table.

[3]

- (ii)** Calculate the difference in the height of the foam produced by cooked and uncooked potato after three minutes. Include the units.

Space for working.

.....[1]

- (iii)** Describe how you made sure that your measurements of the height of the foam in each test-tube could be compared.

.....

[1]

- (iv)** State a conclusion for these results.

.....

[1]

- (b) (i) Identify the variable that was changed (independent variable) in this investigation.

.....[1]

- (ii) State **three** variables, other than the way in which you measured the height of the foam, that should have been kept constant in this investigation.

1

2

3

[3]

- (c) Identify **three** sources of error in this method.

1

.....

2

.....

3

.....

[3]

- (d)** A student was asked to test the hypothesis:

Catalase activity is the same in all species of plants.

Plan an investigation to test this hypothesis.

.....[6]

- (e)** Potatoes contain a lot of starch. When potatoes start to grow to form new plants, the starch is broken down by the enzyme amylase to form reducing sugars.

Explain how you could test samples of potato to show that starch and reducing sugars are present.

starch

.....

.....

reducing sugars

.....

.....

.....

[5]

[Total: 24]

2 Woodlice are small animals.

The rate of respiration of a woodlouse can be measured using a simple respirometer as shown in Fig. 2.1.

As the woodlouse respire the drop of coloured liquid moves along the capillary tube.

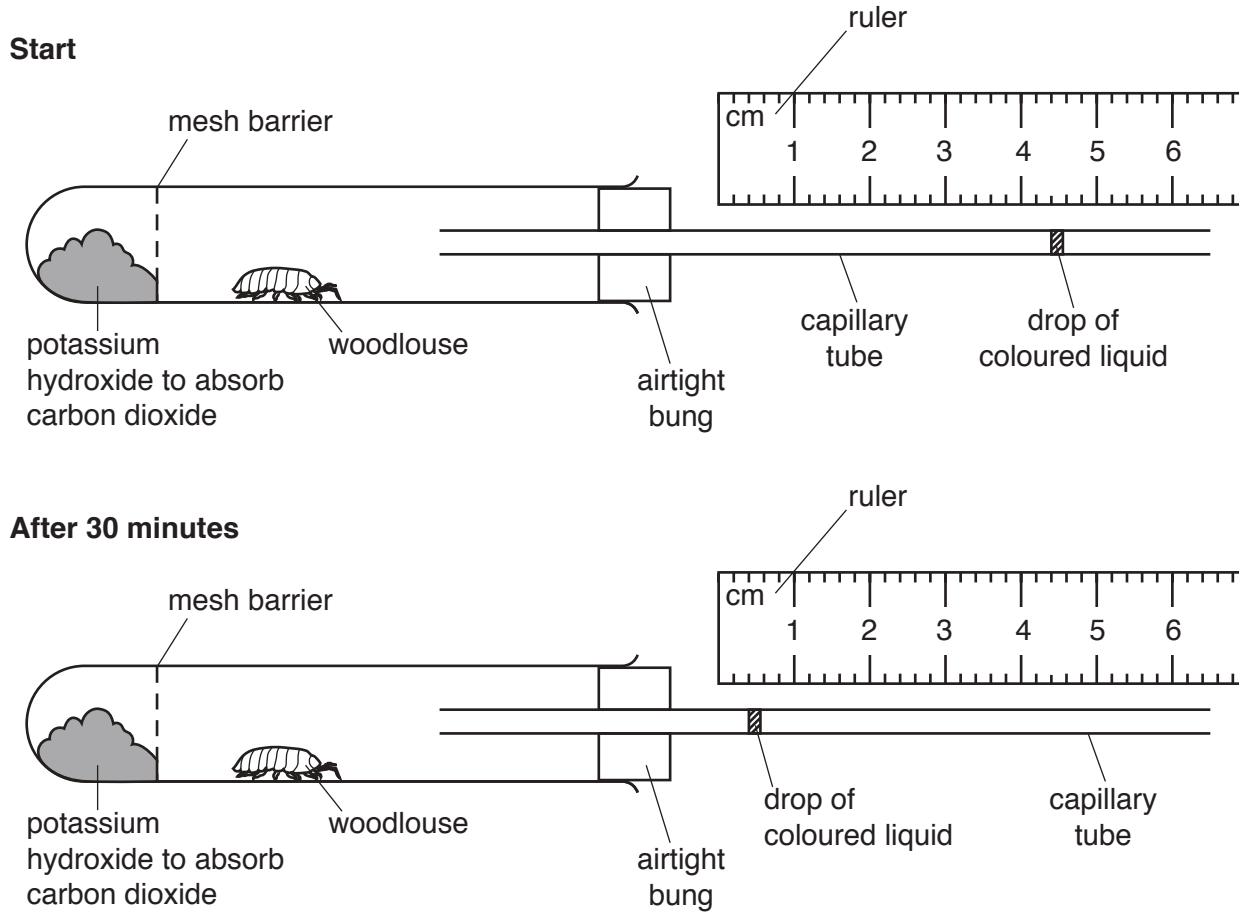


Fig. 2.1

- (a) (i) Record the position of the drop of coloured liquid in the capillary tube shown in Fig. 2.1 at the **start** and **after 30 minutes**.

Start mm

After 30 minutes mm
[1]

- (ii) Using the information in **2(a)(i)**, calculate the rate of movement of the drop of coloured liquid in mm per minute. Give your answer to one decimal place.

Space for working.

..... mm per minute [2]

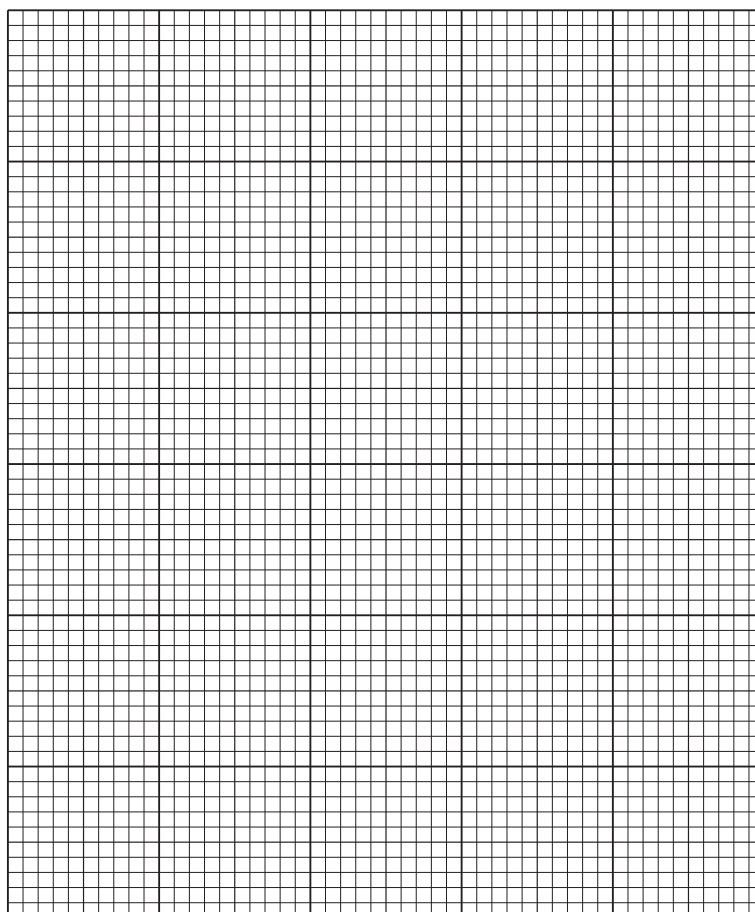
- (b) The rate of movement of the drop of coloured liquid along the respirometer can be used as a measure of the rate of respiration. A student used the apparatus shown in Fig. 2.1 to investigate the rate of respiration in different species of small animals.

The results are shown in Table 2.1.

Table 2.1

animal species	rate of movement of drop of coloured liquid / mm per minute			
	repeat 1	repeat 2	repeat 3	average
A	1.6	1.7	1.3	1.5
B	0.9	1.0	0.7	0.9
C	2.4	2.6	2.5	2.5
D	1.9	2.0	1.9	1.9

- (i) Plot a bar chart on the grid to show the average rate of movement of the drop of coloured liquid in the capillary tube for the four different species of animal.



[3]

- (ii) State which letter represents the animal species with the highest rate of respiration.

.....[1]

- (iii) The student decided it would be better to calculate the rate of respiration per gram of animal so that the values could be compared.

Describe how the student could find out the rate of respiration per gram of animal.

.....

.....

.....

.....[2]

- (c) Fig. 2.2 shows a photograph of a woodlouse.

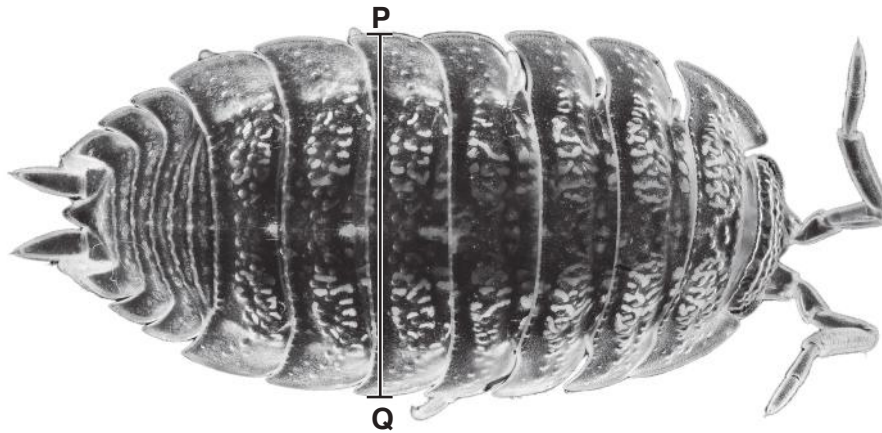


Fig. 2.2

- (i) Draw a large diagram of the woodlouse in Fig. 2.2.

- (ii) The magnification of the woodlouse in Fig. 2.2 is $\times 9$.

Measure the width of the woodlouse along line **PQ**. Include the unit.

length of line **PQ**

Calculate the actual width of the woodlouse using the formula. Include the unit.

$$\text{magnification} = \frac{\text{length of line PQ on Fig. 2.2}}{\text{actual width of woodlouse}}$$

Show your working and give your answer to **two** decimal places.

.....
[3]

[Total: 16]

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