



Rewarding Learning

General Certificate of Secondary Education
2023

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--

Biology

Unit 3 Practical Skills

Booklet A

Higher Tier

[GBL33]



GBL33

TIME

2 hours.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Answer **all** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is **30**.

Task 1 is a practical exercise worth 15 marks.

Task 2 is a practical exercise worth 15 marks.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

Follow all health and safety instructions.

You may use a ruler and calculator if required.

The apparatus and materials required to complete each task are provided.

You will not have access to notes or textbooks to assist you.

For Examiner's use only	
Question Number	Marks
Task 1	
1	
Task 2	
1	
Total Marks	

Task 1: Investigating the process of osmosis by measuring the change in mass of plant tissue (potato).

You **must** wear eye protection when carrying out this task.

Instructions:

1. Label one beaker 0.0 M sucrose solution (0.0 M sucrose solution is water).
2. Label another beaker 0.7 M sucrose solution.
3. Use a cork borer and a white tile to carefully cut two potato cylinders from a potato.
4. Use a knife and the white tile to cut off any skin from the ends of the potato cylinders.
5. Use the knife and the white tile to cut each potato cylinder to a length of 30 mm.
6. Use the balance to weigh each potato cylinder to one decimal place. Record these initial masses in **Table 1**.
7. Place one potato cylinder in the beaker labelled 0.0 M sucrose solution (water).
8. Cover the potato cylinder with 0.0 M sucrose solution (water).
9. Repeat steps 7 and 8 with the other potato cylinder and the 0.7 M sucrose solution.
10. Leave the potato cylinders in the sucrose solutions **for one hour**.

**You may now carry out Task 2
during this one-hour period.**

11. **After one hour** remove the potato cylinder from the beaker labelled 0.0 M sucrose solution (water).
12. Dry the potato cylinder thoroughly using a paper towel.
13. Reweigh the potato cylinder and record this final mass in **Table 1**.
14. Repeat steps 11 to 13 with the potato cylinder in the beaker labelled 0.7 M sucrose solution.
15. Answer **Question 1**.

Question 1

- (a) Complete **Table 1** by calculating the change in mass of each potato cylinder.

Table 1

Sucrose solution concentration / M	Initial mass of potato cylinder / g	Final mass of potato cylinder / g	Change in mass of potato cylinder / g
0.0 (water)			
0.7			

[2]

For the remainder of Task 1 you must work alone.

- (b) Use your answer for the change in mass of the potato cylinder in the 0.0 M sucrose solution (water) in **Table 1** to calculate the percentage change in mass of this potato cylinder.

Show your working.

_____ % [2]

- (c) Give the dependent variable in this experiment.

_____ [1]

- (d) Cutting the potato cylinder into small slices would speed up the rate of osmosis.

Suggest why.

_____ [1]

Examiner Only

Marks Remark

A student repeated the experiment using a wider range of sucrose solution concentrations. She then calculated the percentage change in mass of each potato cylinder.

Table 2 shows the results.

Table 2

Sucrose solution concentration / M	Percentage change in mass of potato cylinders
0.0 (water)	+17.0
0.2	+11.0
0.4	+5.0
0.6	-1.0
0.8	-7.0
1.0	-13.0

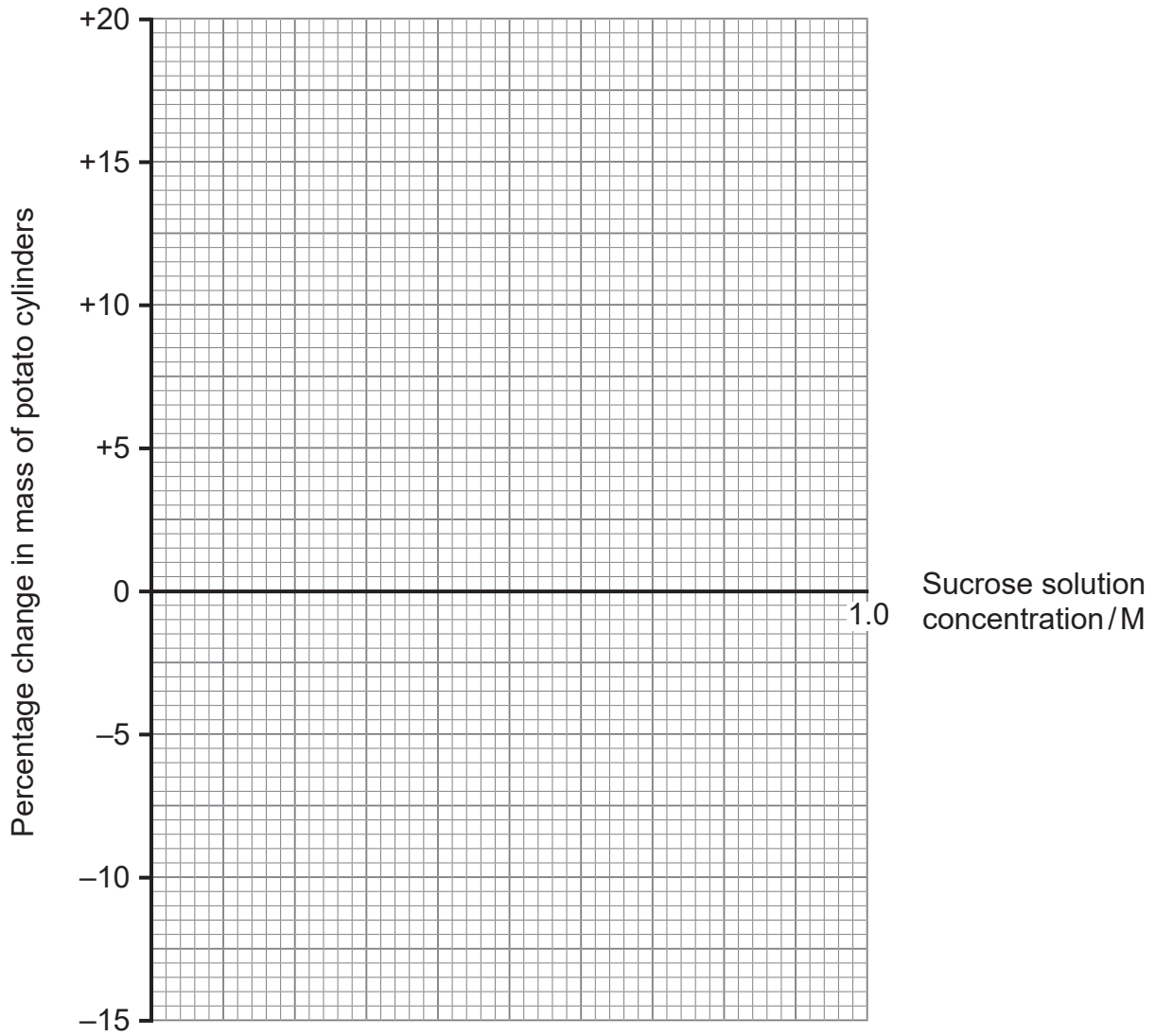
(e) Suggest why the student calculated the percentage change in mass of each potato cylinder.

[1]

(f) On the grid, draw a line graph of the percentage change in mass of the potato cylinders against the sucrose solution concentration by

- selecting the appropriate scale for the x-axis. [1]
- plotting the points accurately. [2]
- using a ruler to join the points. [1]

Examiner Only	
Marks	Remark



(g) Estimate the concentration inside the cells of the potato cylinders.

Use evidence from the graph to explain your answer.

Concentration _____ M

Explanation _____

_____ [4]

Examiner Only	
Marks	Remark

Task 2: Making a temporary slide of onion cells.

You **must** wear eye protection when carrying out this task.

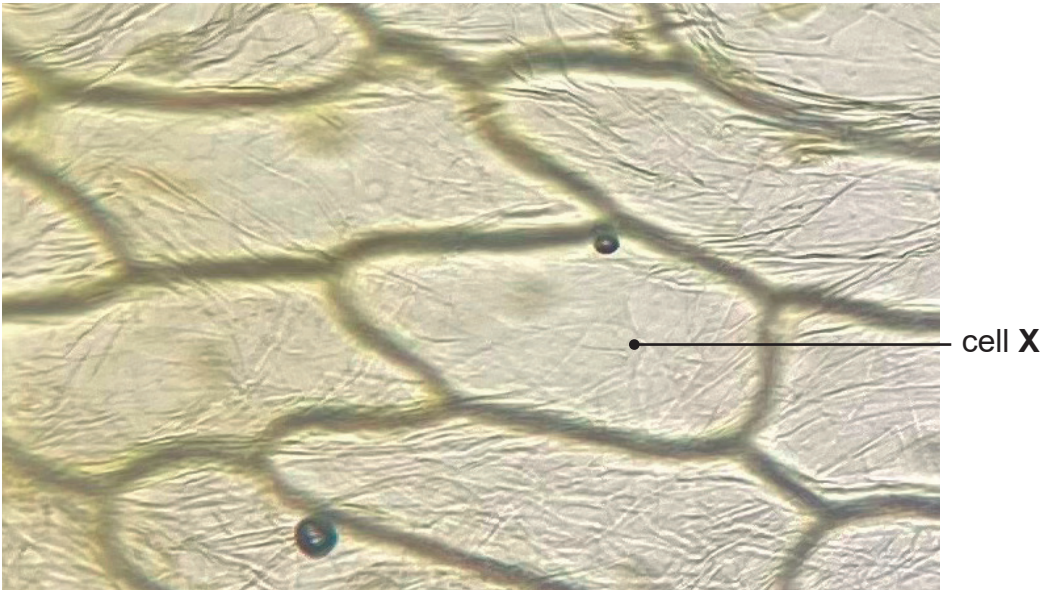
Instructions:

1. Using forceps, peel a single layer of onion cells and place on to a microscope slide.
2. Flatten the layer of onion cells on the microscope slide.
3. Add three drops of iodine solution to stain the layer of onion cells.
4. Using the mounted needle, carefully lower a coverslip on to the layer of onion cells.
5. Place the microscope slide on to the stage of a microscope.
6. Focus the microscope at the lowest magnification to obtain a clear image of the onion cells.
7. Answer **Question 1**.

(b) A student viewed their slide of onion cells at magnification $\times 400$.

Photograph A shows some of these cells.

Photograph A



Source: Principal Examiner

(i) Make a drawing of cell X in the box below.

[4]

(ii) On your drawing, use lines to label the

- nucleus.
- cell wall.

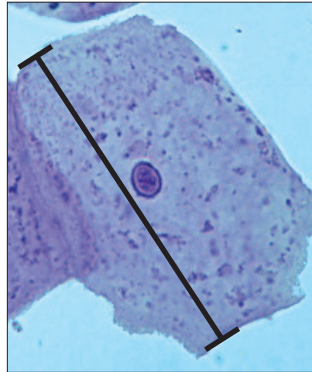
[2]

Examiner Only	
Marks	Remark

Another student used a different method to examine cheek cells under a microscope.

Photograph B shows one of these cheek cells at magnification $\times 1500$.

Photograph B



Source: © Getty Images

(c) Use the line in the photograph to calculate the **actual** length of the cheek cell **in micrometres**.

Show your working.

Actual length _____ micrometres [4]

You should now return and complete the remainder of Task 1.

THIS IS THE END OF THE QUESTION PAPER

Examiner Only	
Marks	Remark

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.