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Biology
Standard level
Paper 1B

11 May 2026

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

Session number

1 hour 30 minutes [Paper 1A and Paper 1B]

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Instructions to students

- Write your session number in the boxes above
- Do not open this examination paper until instructed to do so.
- Answer all questions.
- Answers must be written within the answer boxes provided.
- A calculator is required for this paper.
- The maximum mark for paper 1B is **[25 marks]**.
- The maximum mark for paper 1A and paper 1B is **[55 marks]**.



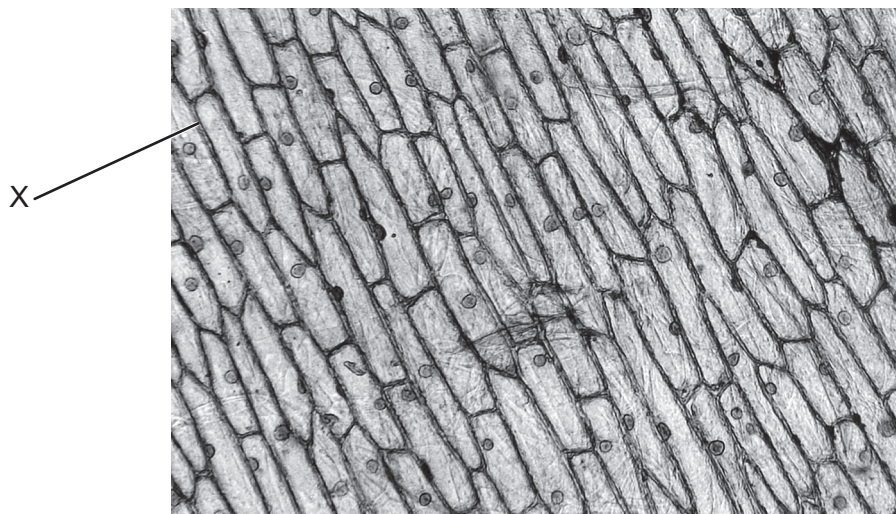
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Answers written on this page
will not be marked.



Answer **all** questions. Answers must be written within the answer boxes provided.

1. The micrograph shows onion (*Allium cepa*) cells under a compound light microscope.



- (a) State the name of the structure labelled X. [1]

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- (b) Identify, using evidence from the micrograph, whether the cells are eukaryotic **or** prokaryotic. [1]

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- (c) Describe how to prepare a temporary mount. [3]

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2. A student measured the rate of photosynthesis by counting the number of leaf discs that float to the top of a beaker. Leaf discs were prepared by using a hole punch, and a syringe was used to remove excess carbon dioxide from the air spaces in all leaf discs. 10 leaf discs were placed in a beaker containing distilled water, with no additional carbon dioxide, and 10 leaf discs were placed in a beaker containing 0.2% sodium hydrogen carbonate, a source of additional carbon dioxide. Both beakers were placed under a light source for 20 minutes. The number of leaf discs that floated to the top of the beakers were counted every minute.

Time / min	Number of floating leaf discs in distilled water	Number of floating leaf discs in 0.2% sodium hydrogen carbonate
1	0	0
2	0	0
3	0	0
4	0	0
5	0	1
6	0	1
7	0	2
8	0	2
9	0	4
10	0	5
11	0	5
12	0	5
13	0	6
14	0	6
15	0	7
16	0	8
17	0	8
18	0	8
19	0	9
20	0	10

(This question continues on the following page)



(Question 2 continued)

- (a) Calculate the mean rate of leaf discs floating to the top of the beaker containing sodium hydrogen carbonate. [1]

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- (b) Identify the control in this experiment. [1]

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- (c) Explain the difference in the results between the two beakers. [3]

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- (d) Describe how the student could improve this experiment. [2]

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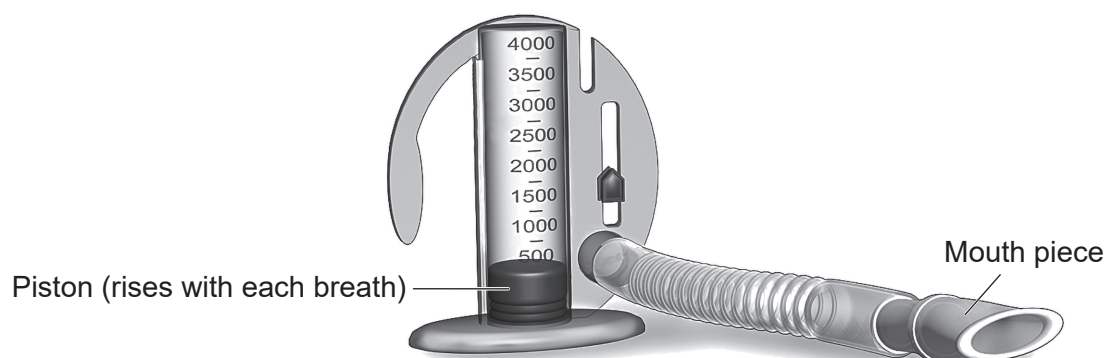


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3. The diagram shows a spirometer, which can be used to measure lung volumes.



- (a) Define tidal volume. [1]

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- (b) Suggest a procedure a student could use to measure vital capacity with this spirometer. [2]

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- (c) Explain how muscle action can cause a maximum inhalation. [3]

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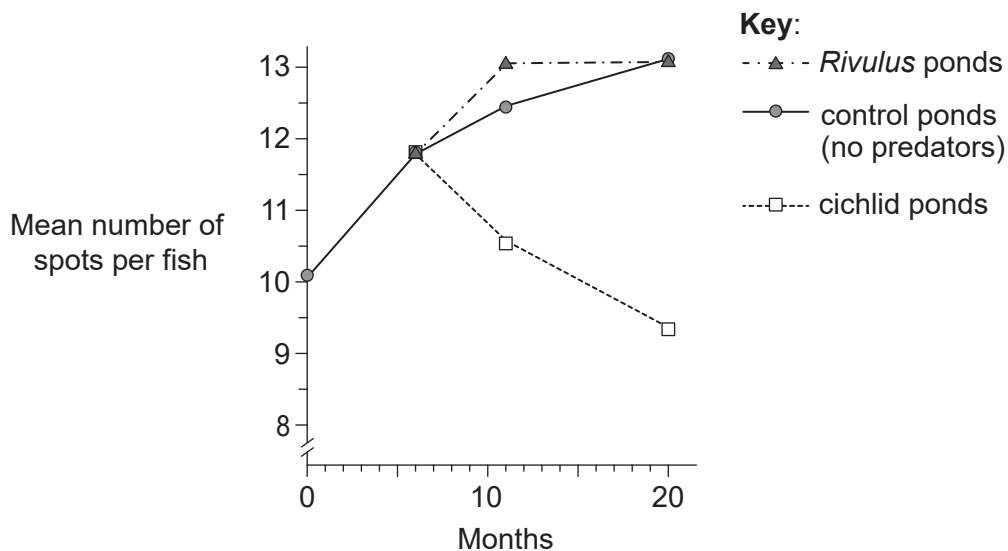
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4. John Endler observed variation in the number of spots on guppies (*Poecilia reticulata*) in different natural streams. He noticed that guppies sharing a stream with predatory cichlids had fewer spots than guppies living with *Rivulus* (killifish), which are weaker predators.

Endler moved guppies into artificial ponds with no predators and left them for six months, allowing several generations of fish to grow up, reproduce and die. He then divided his guppy population among 10 artificial ponds, some with cichlids, some with *Rivulus* and some without predators. After 11 months and again at 20 months, he counted the spots on male guppies from his artificial ponds.



[Source: John A. Endler. 'Natural Selection on Color Patterns in *Poecilia reticulata*.' *Nature* (34) 1 (1980): 76–91. <https://doi.org/10.2307/2408316>. Reproduced by permission of Oxford University Press on behalf of the Society for the Study of Evolution. Source adapted.]

- (a) Identify the mean number of spots per fish found in cichlid ponds at 20 months. [1]

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- (b) State the dependent variable in Endler's experiment. [1]

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(This question continues on the following page)



(Question 4 continued)

- (c) Explain what caused the number of spots to change in the control population. [2]

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- (d) Justify Endler's conclusion that predators affected the variation among the population of guppies. [3]

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References:

1. Berkshire Community College Bioscience Image Library. [https://commons.wikimedia.org/wiki/File:Living_cells_of_onion_epidermis_\(33605021164\).jpg](https://commons.wikimedia.org/wiki/File:Living_cells_of_onion_epidermis_(33605021164).jpg). Public domain.
3. BruceBlaus. https://commons.wikimedia.org/wiki/File:Incentive_Spirometer.png. Licensed under CC BY-SA 4.0 <https://creativecommons.org/licenses/by-sa/4.0>.
4. John A. Endler. 'Natural Selection on Color Patterns in *Poecilia reticulata*.' *Nature* (34) 1 (1980): 76–91. <https://doi.org/10.2307/2408316>. Reproduced by permission of Oxford University Press on behalf of the Society for the Study of Evolution. Source adapted.

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12EP10

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12EP11

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12EP12