

Paper Reference(s) 9BI0/02
Pearson Edexcel Level 3 GCE

Biology B

Advanced

PAPER 2: Advanced Physiology, Evolution and Ecology

Friday 16 June 2023 – Morning

Diagram Booklet

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

INSTRUCTIONS

There may be spare copies of some diagrams in case you need them.

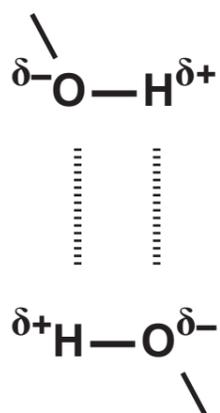
THIS DIAGRAM BOOKLET MUST BE RETURNED WITH THE QUESTION PAPER AT THE END OF THE EXAMINATION.

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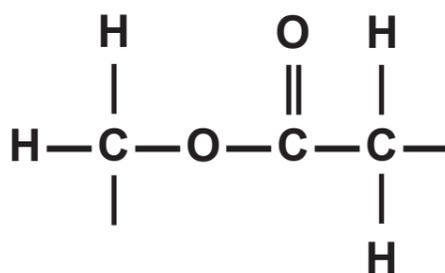
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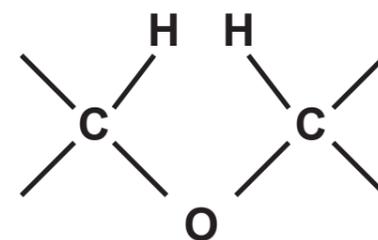
Question 1(a)



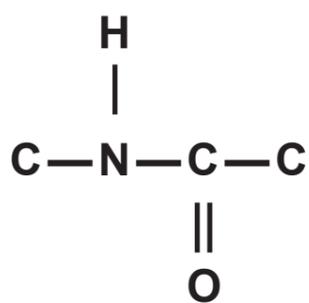
V



W



X



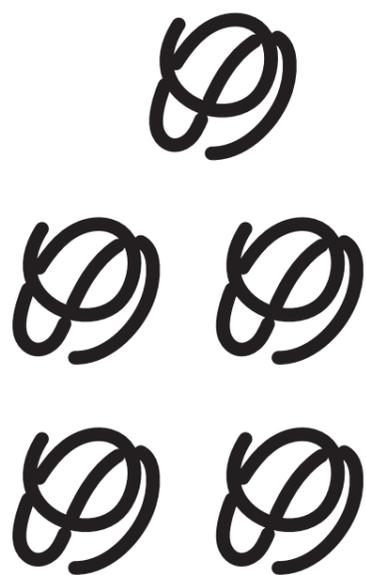
Y



Z

Question 1(b)

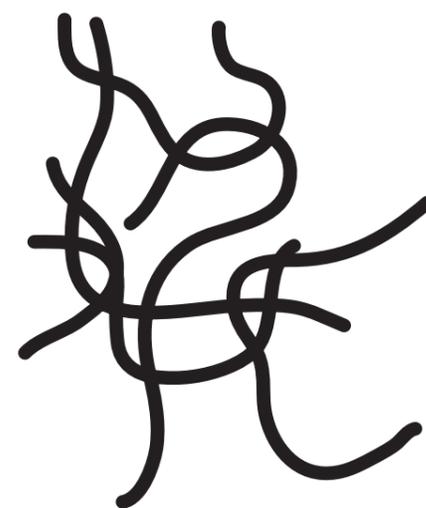
ovalbumin in
raw egg white



heat to temperature
above 70 °C



ovalbumin in
solid egg white

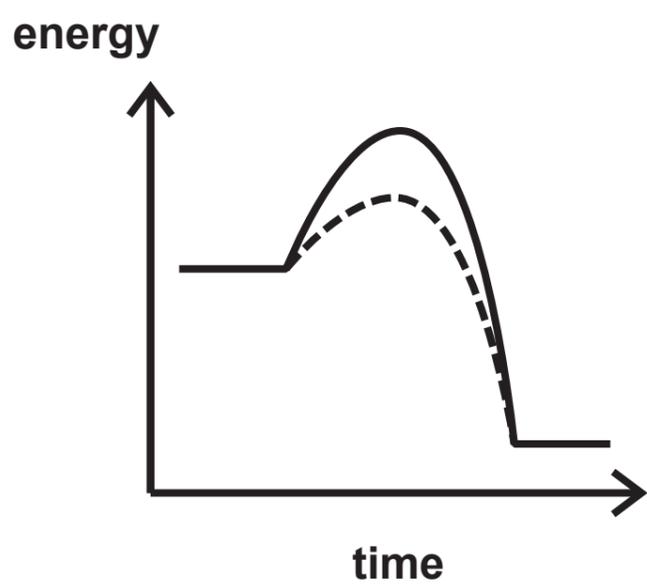


Question 2(a)

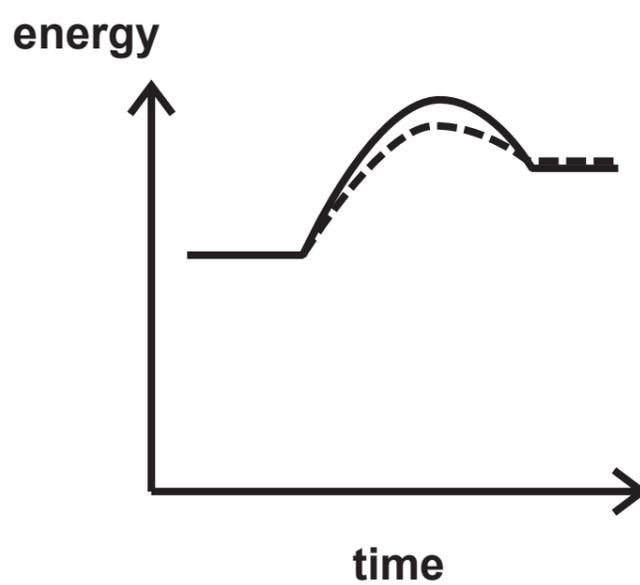
KEY:

—— without enzyme

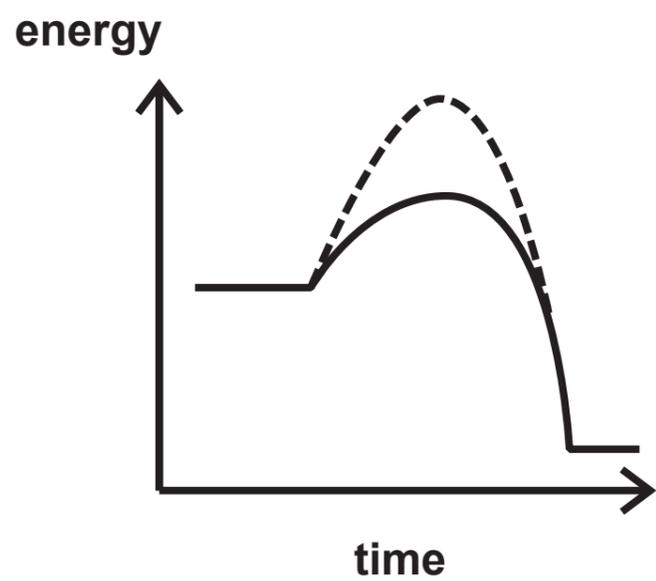
..... with enzyme



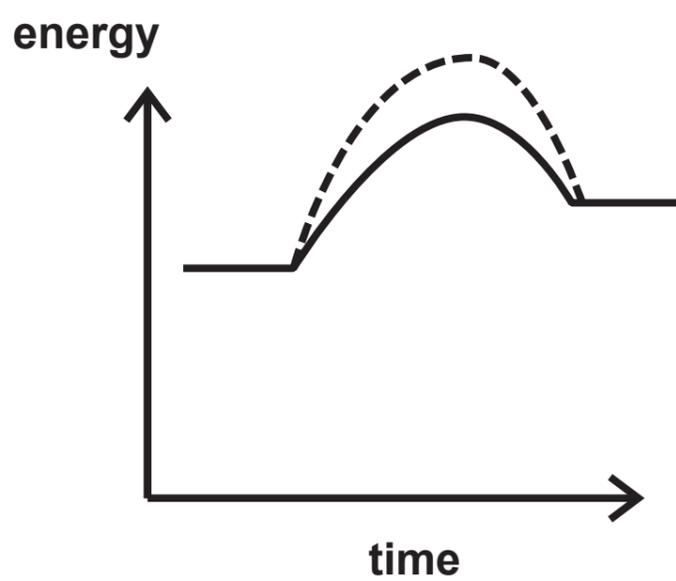
W



X

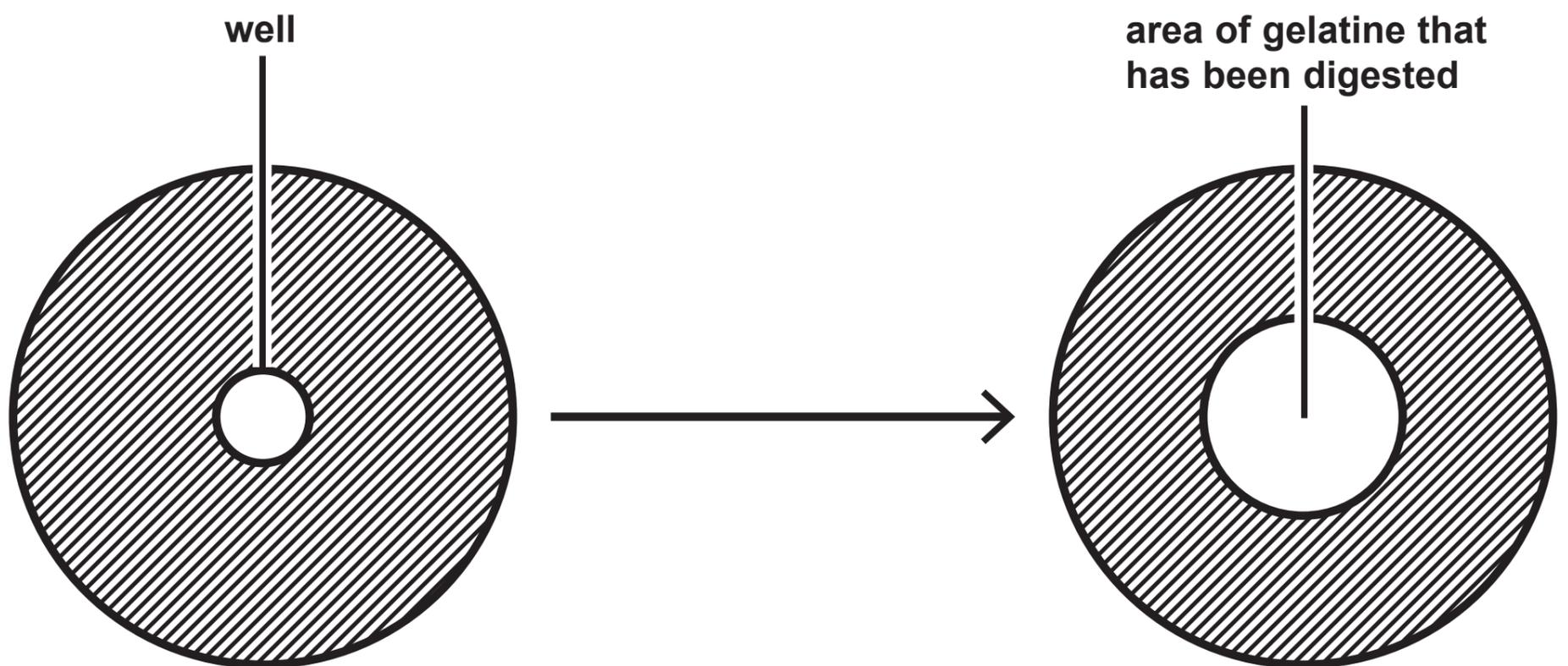


Y



Z

Question 2(b)



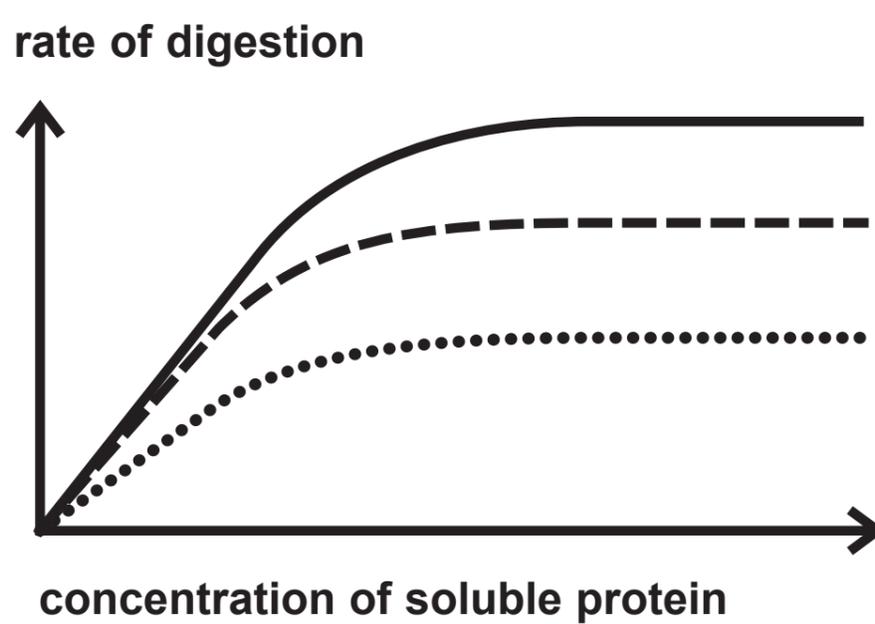
Question 2(c)

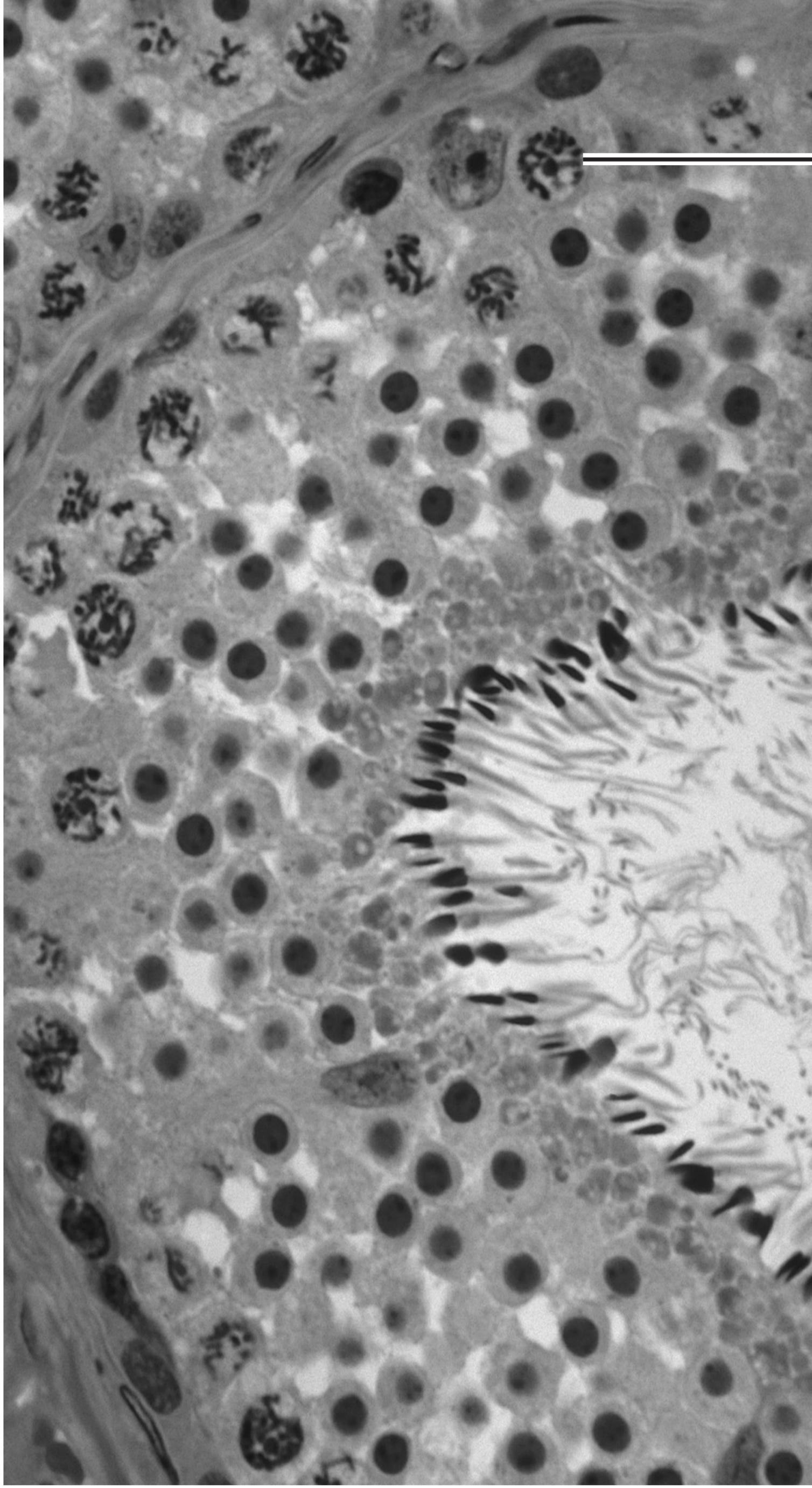
KEY:

———— no copper sulfate

- - - - medium concentration of copper sulfate

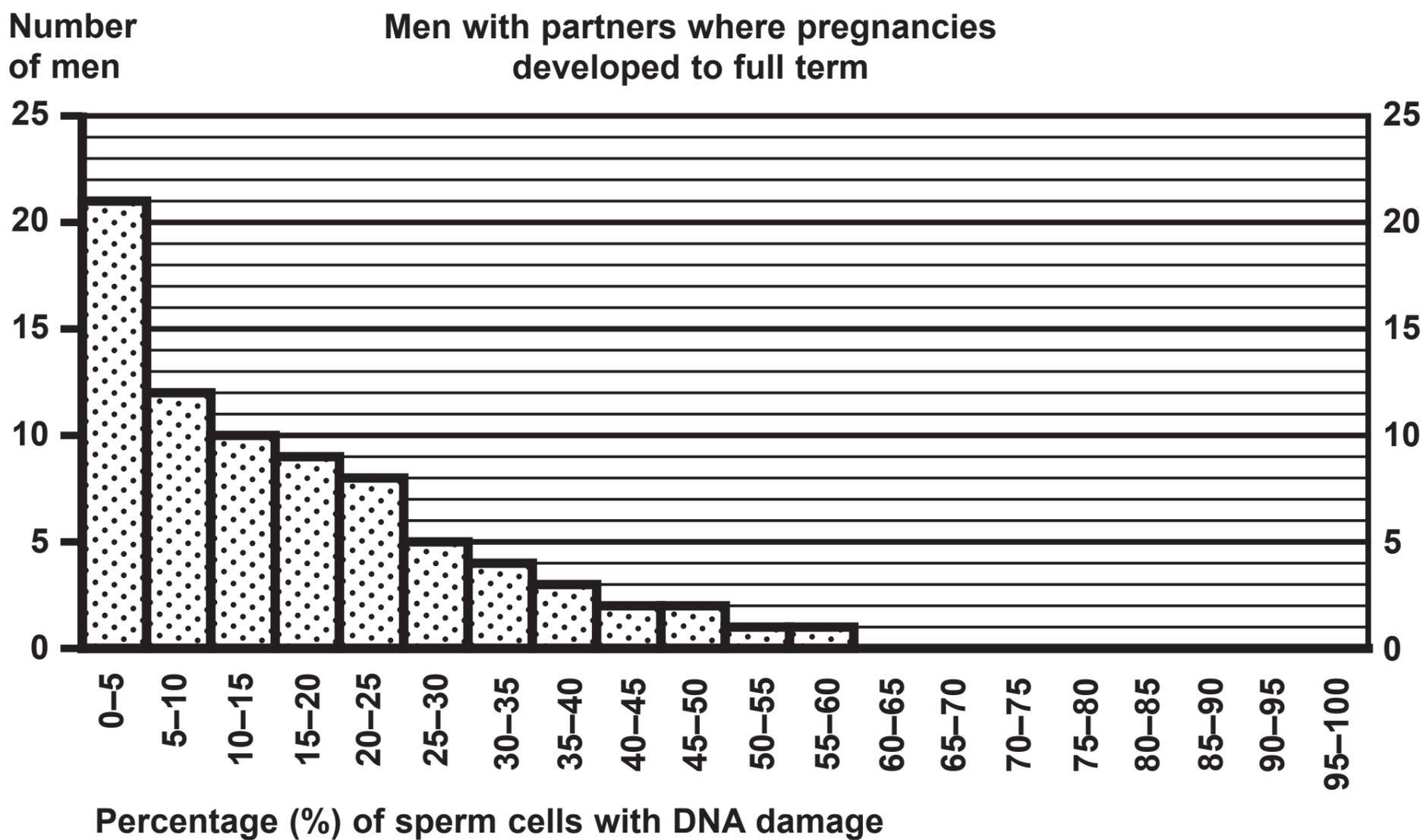
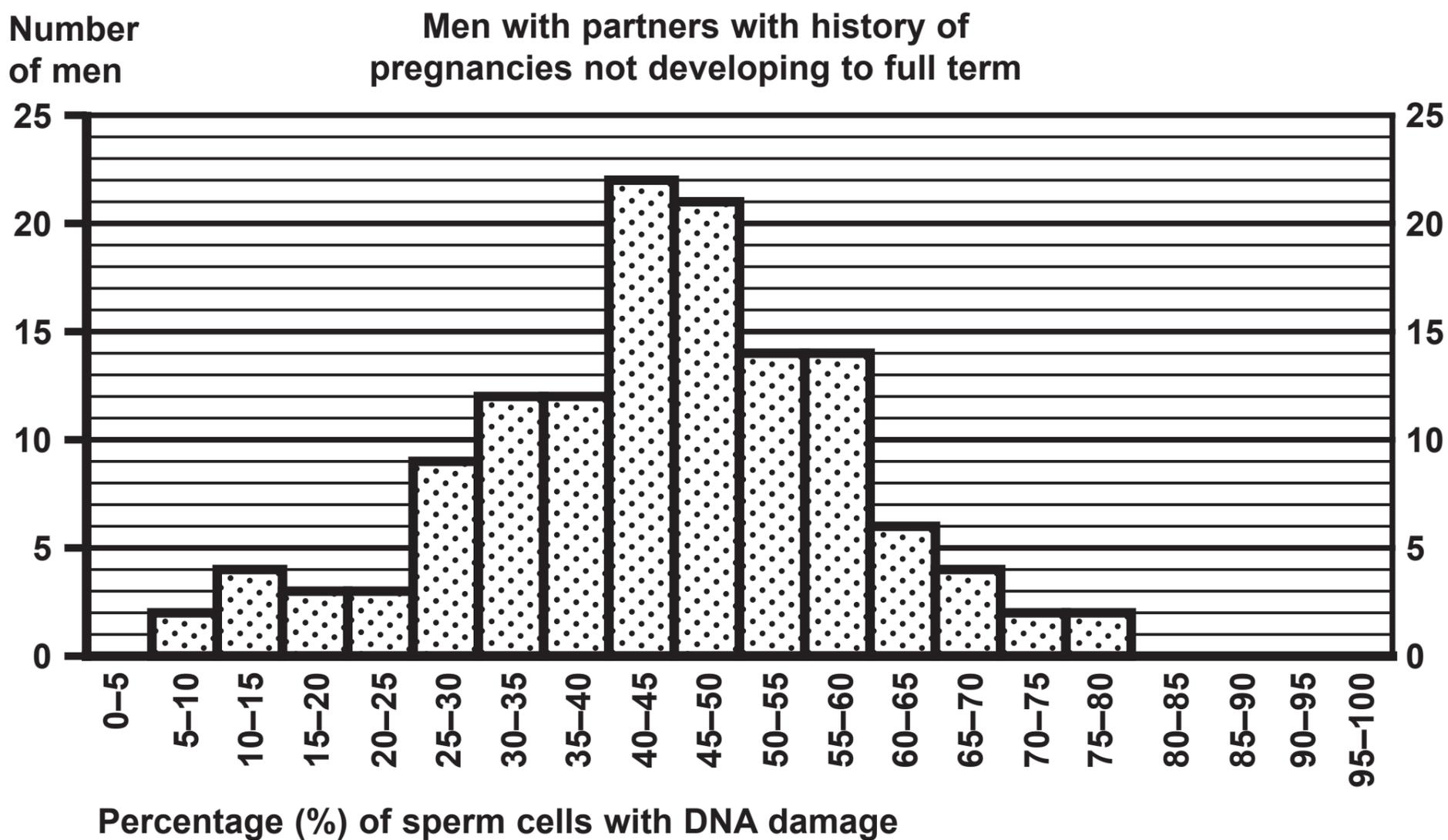
..... high concentration of copper sulfate





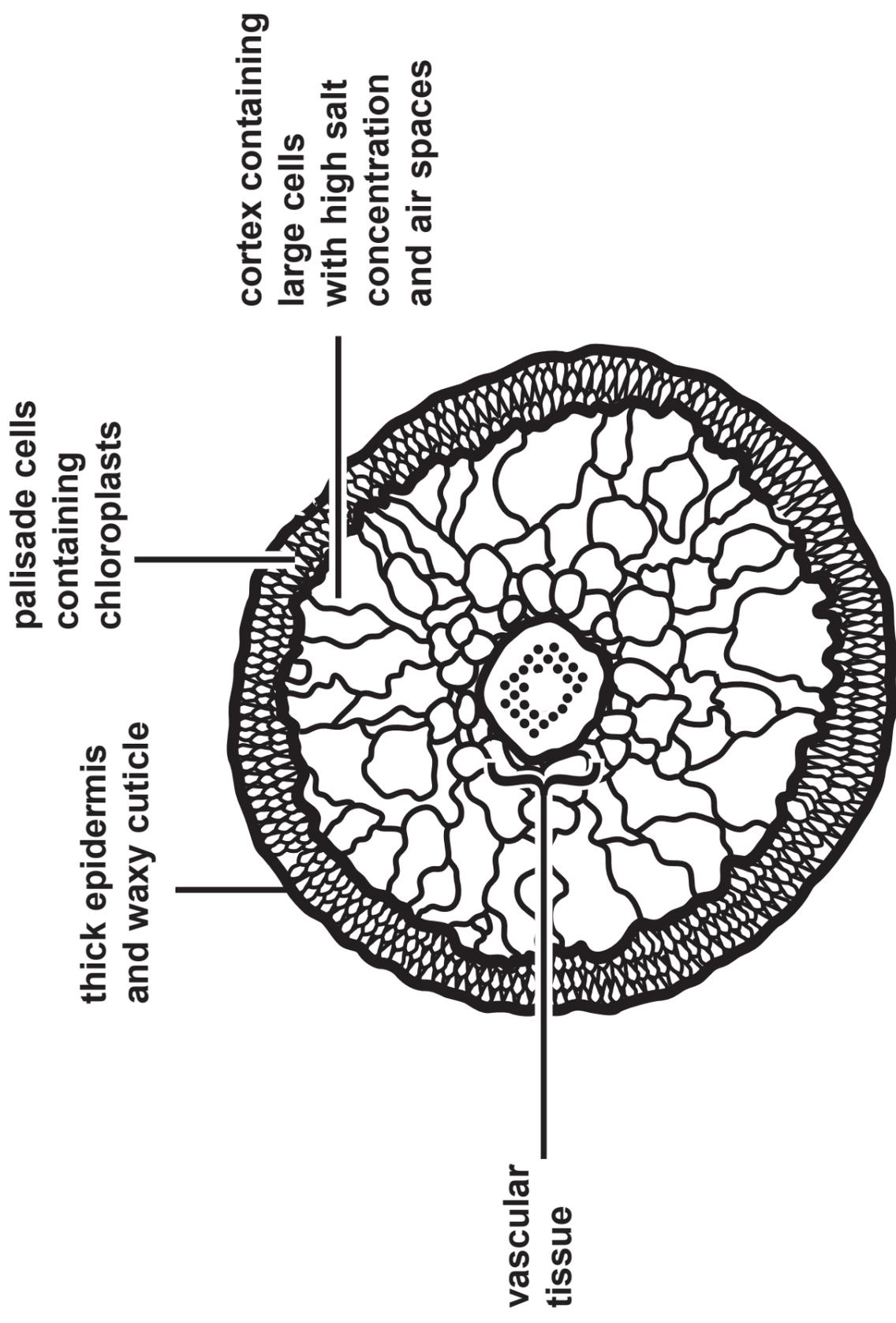
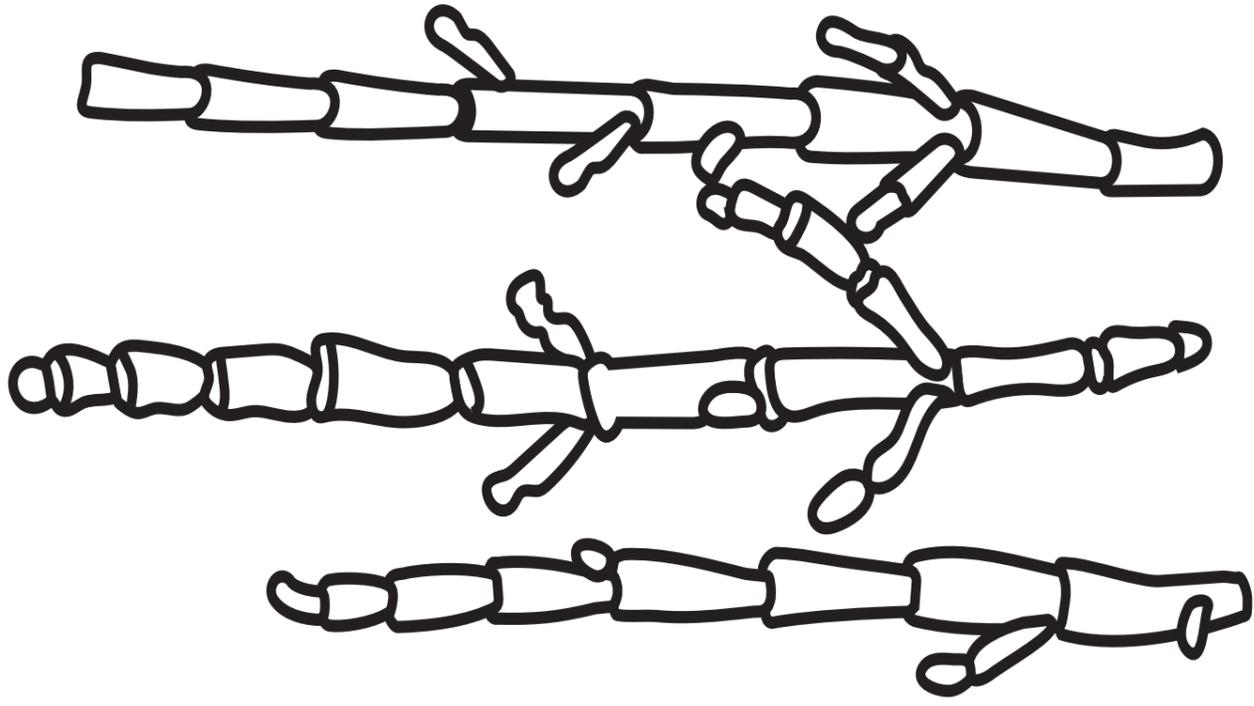
X

Question 3(b)



The black and white photograph shows an area of saltmarsh that has recently been flooded as there are wet areas between exposed grass caused by retreating water.





Question 4(b)

Factor		Distance from sea/m				
		0	5	10	15	20
ACFOR scales	Samphire	Abundant	Common	Rare	Absent	Absent
	Sea lavender	Absent	Rare	Common	Common	Rare
	Scurvy grass	Absent	Absent	Rare	Occasional	Abundant
Index of diversity for all plant species		0·20	0·54	0·85	2·54	2·85
Percentage of silt made up of organic material (%)		15	10	25	35	55

Question 5(b)

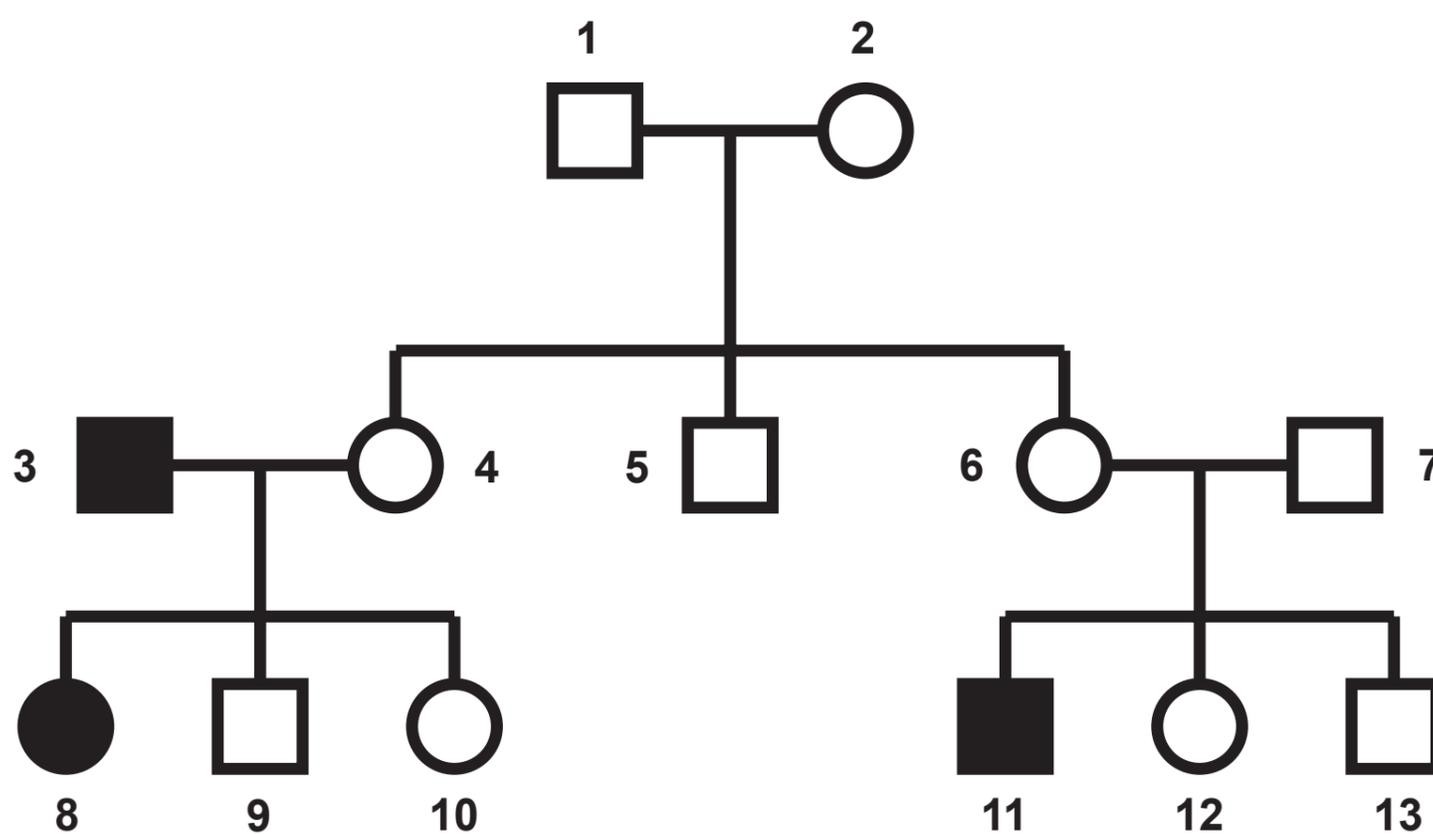
KEY:

□ male without
colour blindness

■ male with
colour blindness

○ female without
colour blindness

● female with
colour blindness



Question 5(c)(i)

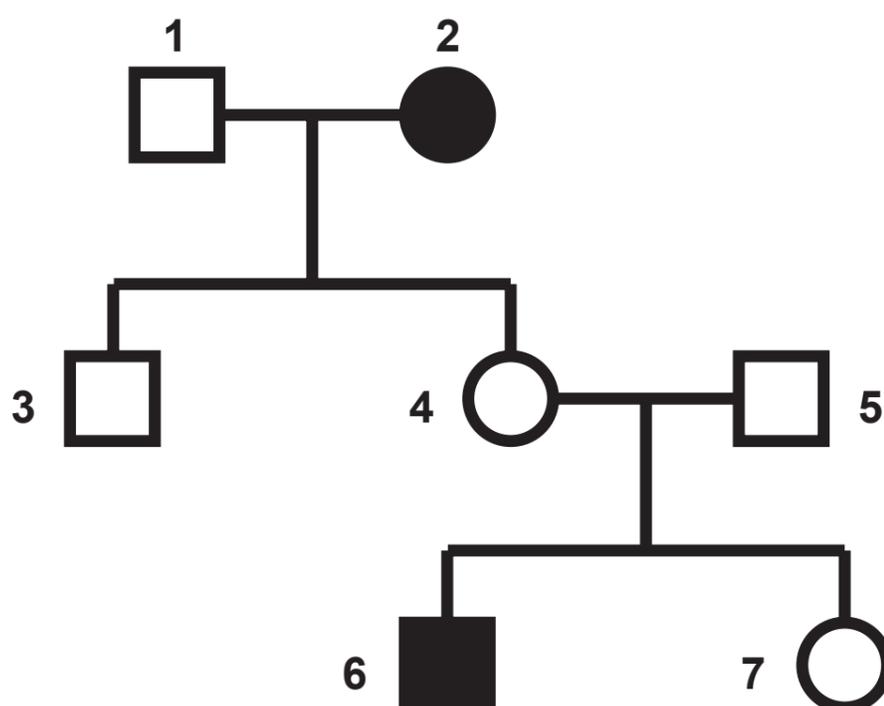
KEY:

□ male without achromatopsia

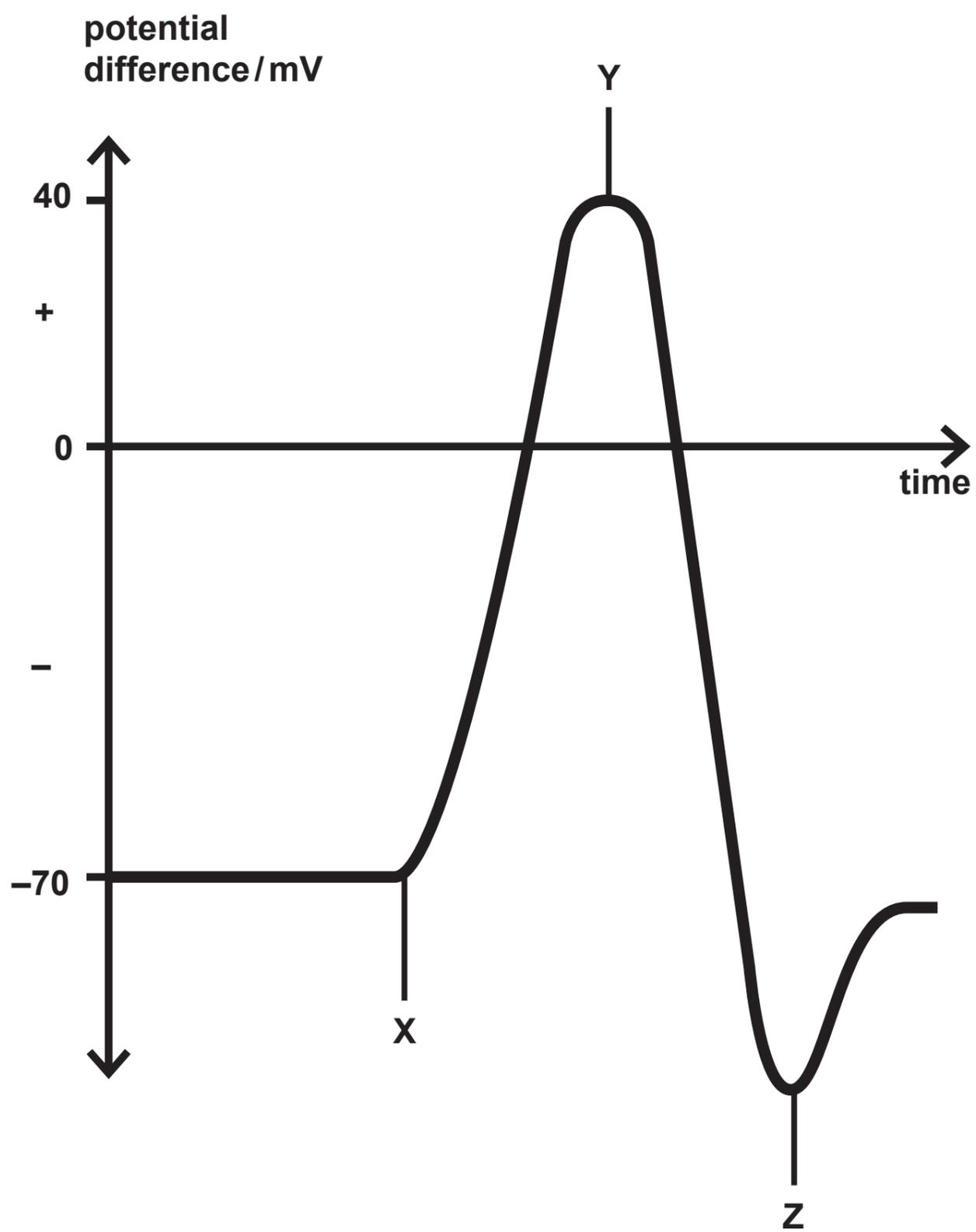
■ male with achromatopsia

○ female without achromatopsia

● female with achromatopsia



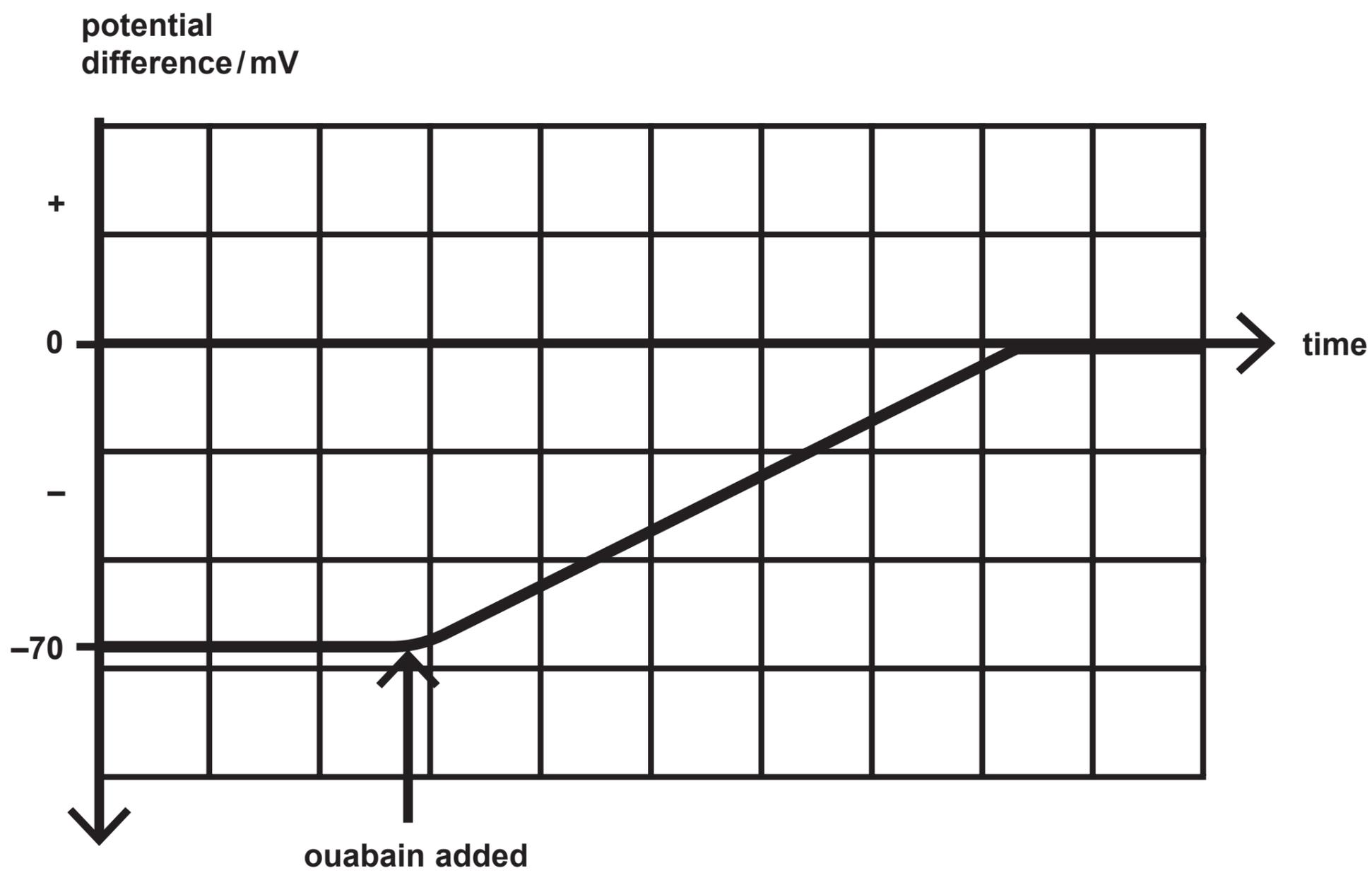
Question 6(a)



The black and white photograph shows a small, lightly striped rodent with long spines across the length of its body. It is very low to the ground, walking amongst leaf litter.



Question 6(b)(ii)



Question 7(b)

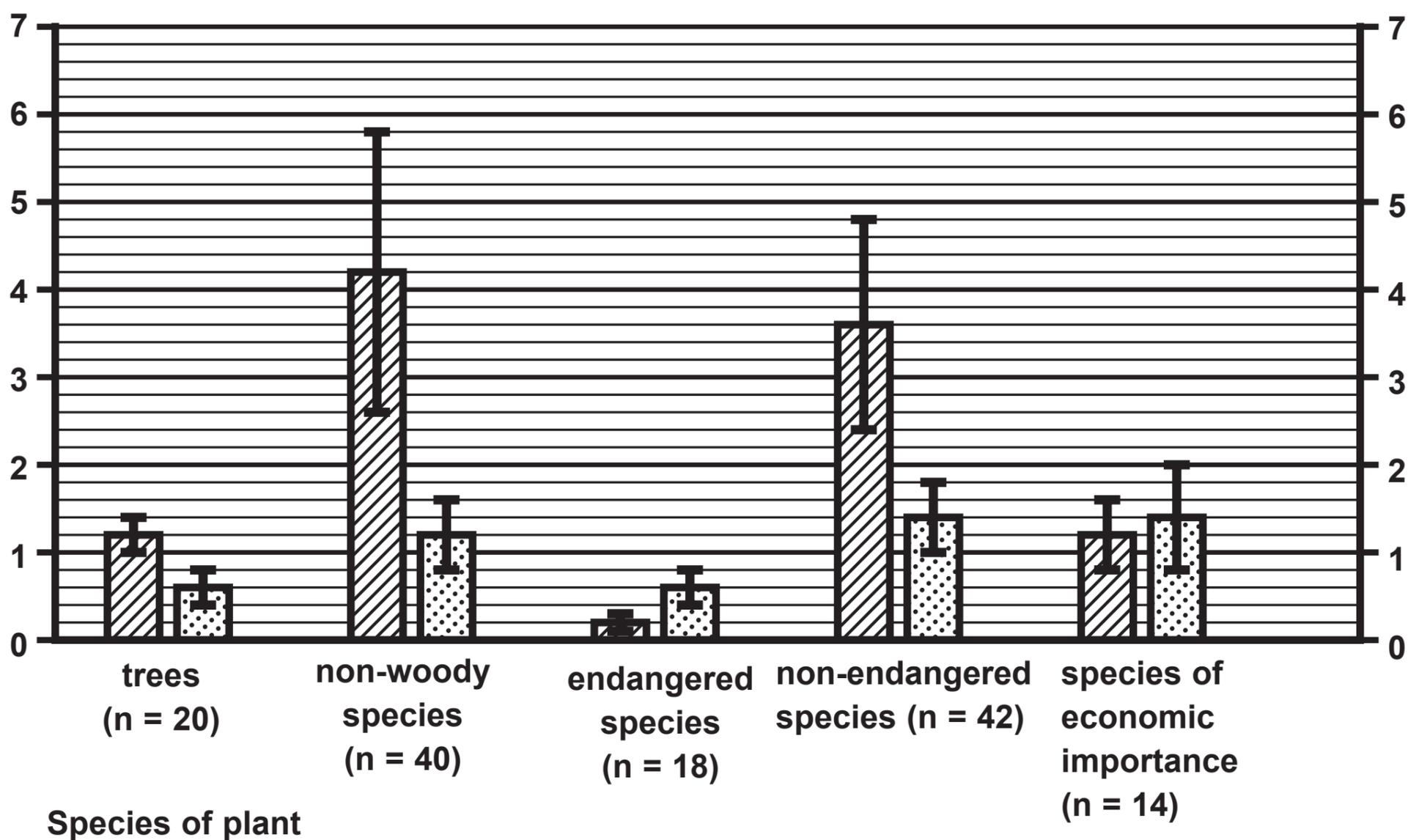
KEY:

 in the wild

 in seed banks
Error bars represent ± 1 standard deviation

n = number of different species

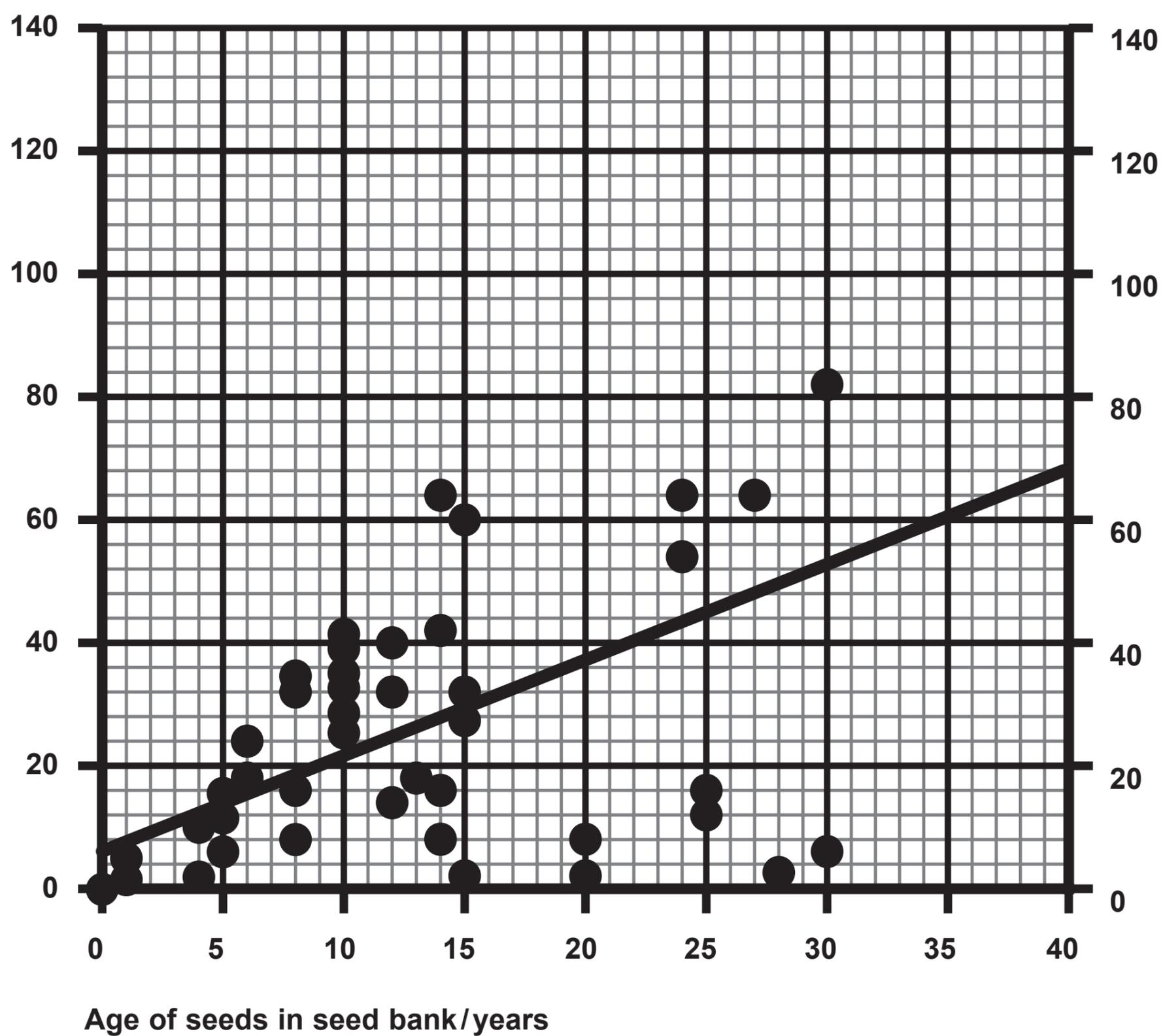
Genetic diversity/a.u.



Question 7(b)

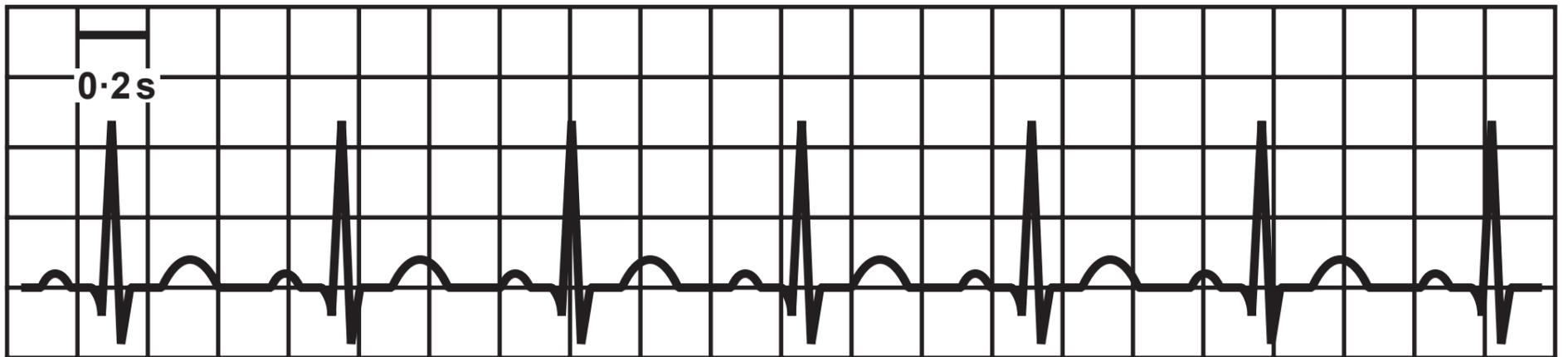
Each point represents one species

Mean number of differences in
DNA sequences from seed bank
compared with wild plant

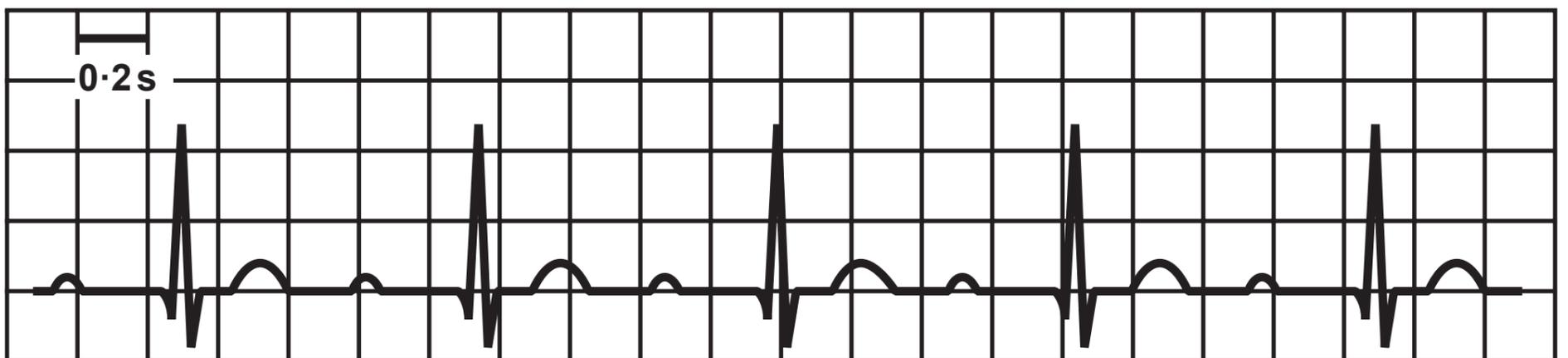


Question 8(b)

Person with regular heart rhythm



Person with abnormal heart rhythm

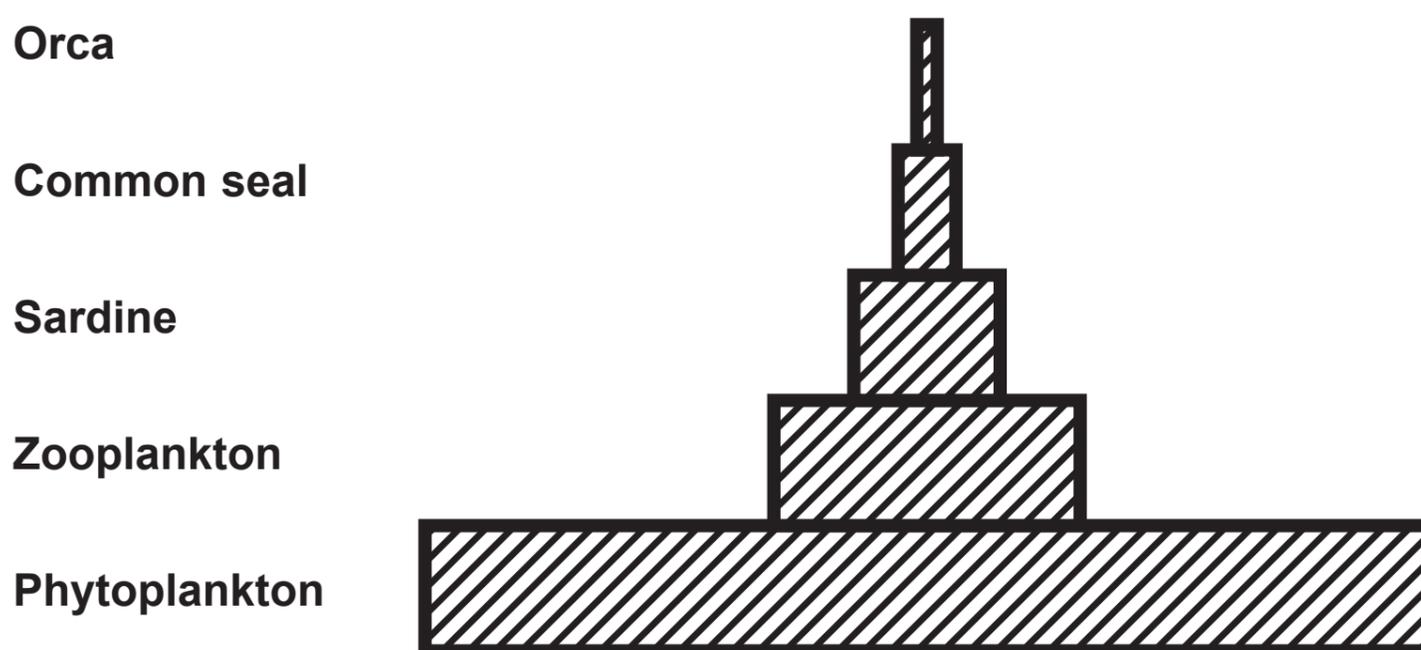


Question 9(a)

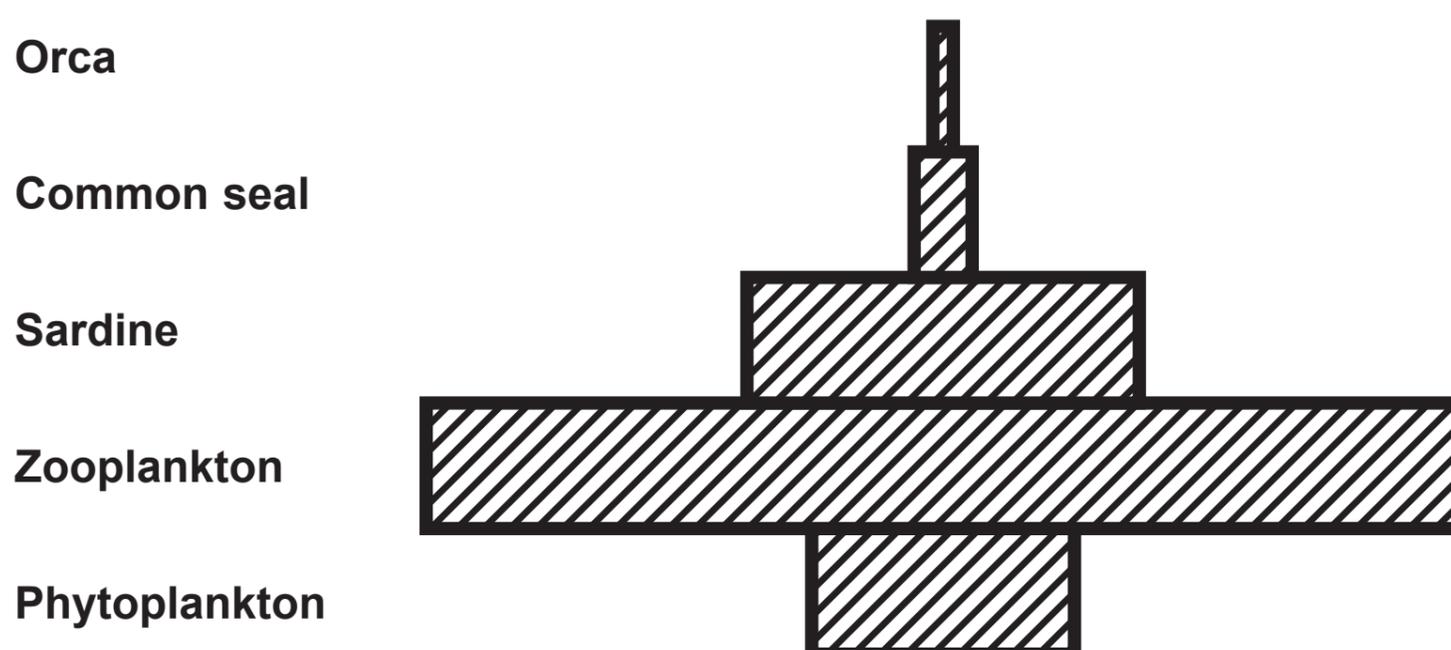
The units for biomass are kg m^{-3}

The units for energy are $\text{kJ m}^{-3} \text{yr}^{-1}$

Pyramid of biomass for November



Pyramid of biomass for December



(continued on the next page)

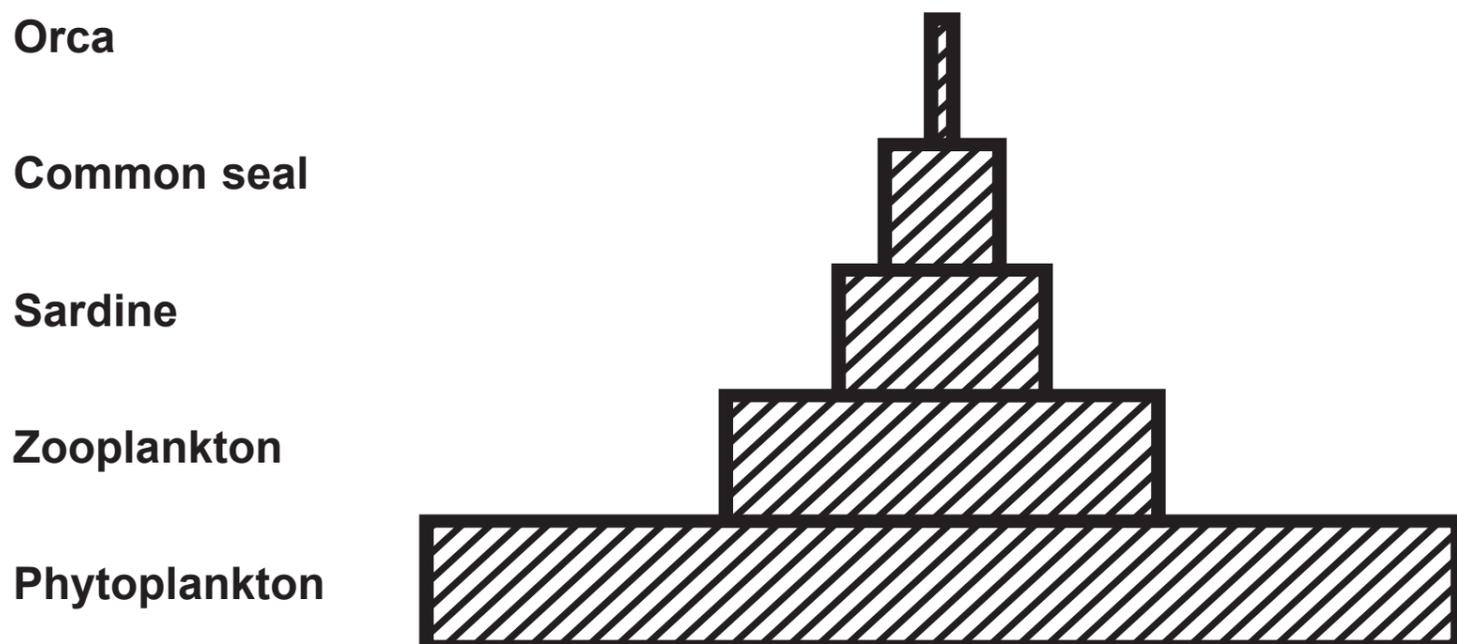
Turn over

Question 9(a) continued.

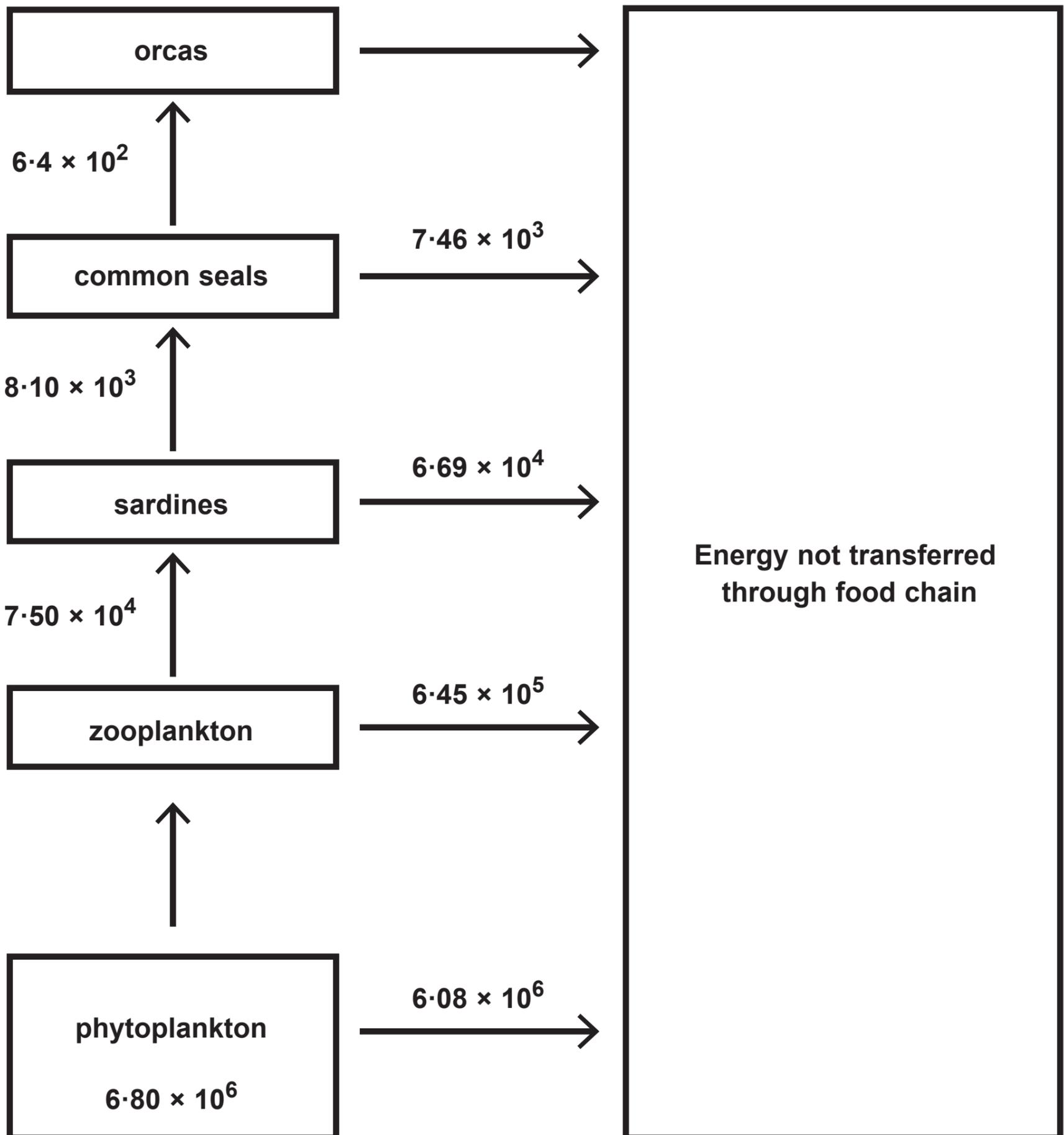
The units for biomass are kg m^{-3}

The units for energy are $\text{kJ m}^{-3} \text{yr}^{-1}$

Pyramid of energy for one whole year



Question 9(b)



Question 9(c)

Light intensity /arbitrary units	Mean increase in dry biomass of phytoplankton/g		
	10 °C	20 °C	30 °C
5	4	6	2
10	8	10	4
15	10	20	15
20	12	24	28
25	12	28	35

Question 3(a):

(Source: © M. I. WALKER / SCIENCE PHOTO LIBRARY)

Question 4(a):

(Source ©BOB GIBBONS / SCIENCE PHOTO LIBRARY)

Question 6(b):

(Source: © https://commons.wikimedia.org/wiki/File:Lophiomys_imhausi.jpg)