

Interactive Example Candidate Responses

Paper 4 (May/June 2016), Question 5

Cambridge International AS & A Level

Biology 9700

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- 5 Fig. 5.1 shows a water vole, *Arvicola amphibius*. This species is native to Great Britain.



Fig. 5.1

The numbers of water voles are estimated to have fallen by 94% in the last century.

This is thought to be due to habitat fragmentation and also to extensive predation by mink, *Neovison vison*, shown in Fig. 5.2. Mink originated in North America but were brought to Great Britain for fur farming. Some escaped or were released into the wild, where their numbers rapidly increased.



Fig. 5.2

- (a) Name and describe a method for estimating the abundance of water voles in a local area.

The mark-release-and-recapture method can be used.
Capture a certain number of voles (e.g. 100) and mark them
using a method that won't affect their survival (e.g. shaving
a patch of fur on their backs). Release them and after
36 hours recapture as many voles as possible, counting
how many in total are recaptured and of those how many
are marked. $\text{Abundance} = \frac{\text{total no. of voles marked} - \text{those marked + recaptured}}{\text{no. of voles recaptured}}$

[4]

Your
Mark

5(a)

5(b)

5(c)(i)

5(c)(ii)

Q5	Mark scheme
(a)	<p>1 mark-release-recapture / AW ; A catch, mark, return, catch A mark-and-recapture description (max 3) 2 detail of trapping ; e.g. Longworth / Sherman / live / small mammal 3 detail of marking ; e.g. felt tip pen / clipping fur / not to have adverse effects 4 detail of timing of second trapping ; e.g. not too soon or mixing will not occur / not too long after as migration may occur / after 24 hours / 1 day (any number of days up to two weeks) 5 detail of calculation ; e.g. Lincoln Index / Petersen index or number marked time 1 \times no. captured time 2 number of marked individuals recaptured time 2 A symbols in equation if key is given [max 4]</p>
(b)	<p>glycogen ; centrioles / centrosomes ; (may have) cilia / flagella / microvilli ; no cell wall ; no, large / central / permanent, vacuole ; A no tonoplast [max 2]</p>
(c)(i)	<p>1 reduce, other organisms' abundance / biodiversity ; A endanger, rare species / water voles A causes extinction 2 alter food, chains / webs ; 3 due to predation ; 4 due to competition ; 5 due to spreading disease ; 6 may change habitat ; e.g. create shade, change soil pH 7 may be toxic / threaten human health ; [max 3]</p>
(c)(ii)	<p>culling / hunting / trapping ; contraceptive measures ; biological control disease agent ; I introduce new mink-eating predator I biological control alone [max 1] [Total: 10]</p>

- (b) Both water voles and mink are classified as class Mammalia, phylum Chordata, kingdom Animalia.

Outline two features of the **cells** of members of the kingdom Animalia that distinguish them from the cells of other multicellular eukaryotes.

- 1 They have cilia
.....
.....
2 No cell wall
.....
..... [2]

- (c) (i) Discuss the reasons why alien species should be controlled.

Alien species have no natural predators and their prey have not evolved natural defense mechanisms against them. As a result, their numbers will increase at the cost of other species' survival. This may lead to other species becoming endangered or extinct due to reducing population sizes and can also lead to destruction of habitat. They must be controlled to conserve biodiversity and genetic diversity, and maintain balance in the food chain of the ecosystem. [3]

- (ii) Suggest one way of controlling mink numbers in Great Britain.

By giving minks chemical contraception to keep numbers of offspring at a manageable level.
..... [1]

[Total: 10]

Your
Mark

5(a)

5(b)

5(c)(i)

5(c)(ii)

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Fig. 5.1

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This is thought to be due to habitat fragmentation and also to extensive predation by mink, *Neovison vison*, shown in Fig. 5.2. Mink originated in North America but were brought to Great Britain for fur farming. Some escaped or were released into the wild, where their numbers rapidly increased.



Fig. 5.2

- (a) Name and describe a method for estimating the abundance of water voles in a local area.

By random sampling a quadrat is used / in which all water voles in that Mark-release-recapture because method because it is a mobile animal. The area of the local area is calculated. Some water voles are captured and marked and counted. Then they are released in the wild and allowed to mix. Then the water voles are again captured, the marked water voles are counted and the unmarked water voles are counted. The ratio of marked to unmarked is assumed to be the same for the whole population so that ratio is the same as the ratio of originally marked spec water voles to the rest of water voles in the area. [4]

Your
Mark

5(a)

5(b)

5(c)(i)

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- (b) Both water voles and mink are classified as class Mammalia, phylum Chordata, kingdom Animalia.

Outline two features of the cells of members of the kingdom Animalia that distinguish them from the cells of other multicellular eukaryotes.

- 1 they have ~~centrioles~~ and centrioles and centrioles
- 2 they ~~are~~ don't have cell walls, large vacuoles or chloroplast.

[2]

- (c) (i) Discuss the reasons why alien species should be controlled.

Because they compete for food and habitat with original local species causing their numbers to drop. They might not have any natural predators in that area causing their numbers to increase uncontrollably. Some alien plants grow on buildings, destroy them. They don't fit in the food chain. They might feed on an endangered species uncontrollably causing it to get extinct.

[3]

- (ii) Suggest one way of controlling mink numbers in Great Britain.

Allowing people to hunt them, legalise hunting mink.

[1]

[Total: 10]

Your
Mark

5(a)

5(b)

5(c)(i)

5(c)(ii)

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Fig. 5.2

- (a) Name and describe a method for estimating the abundance of water voles in a local area.

By sampling, then choosing a certain area, counting how many water voles there are in that certain area and then multiplying by how large the area is.

[4]

Your
Mark

5(a)

5(b)

5(c)(i)

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- (b) Both water voles and mink are classified as class Mammalia, phylum Chordata, kingdom Animalia.

Outline two features of the **cells** of members of the kingdom Animalia that distinguish them from the cells of other multicellular eukaryotes.

1. Contain Lysosomes
2. May have microvilli.
- [2]

- (c) (i). Discuss the reasons why alien species should be controlled.

They can exterminate other species. Will affect the biodiversity (ecosystem) of that area, and also will change food chains.

[3]

- (ii) Suggest one way of controlling mink numbers in Great Britain.

By releasing a predator of the mink.

[1]

[Total: 10]

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5(a)

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