

5.1 Evolution & Natural Selection

Question Paper

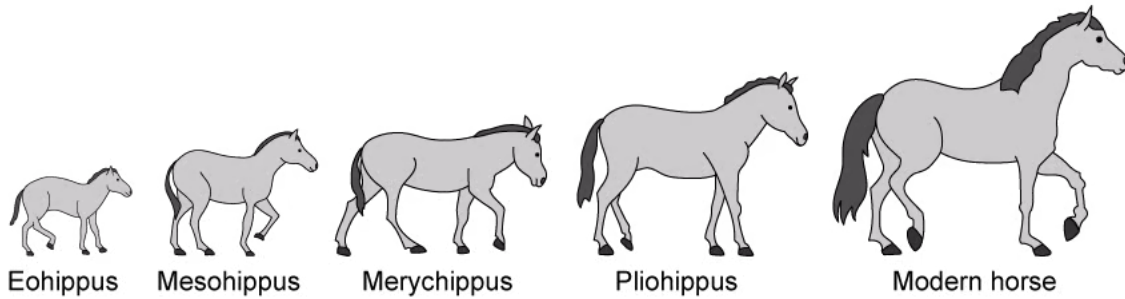
Course	DP IB Biology
Section	5. Evolution & Biodiversity
Topic	5.1 Evolution & Natural Selection
Difficulty	Easy

Time allowed: 40
Score: /32
Percentage: /100

Question 1a

a)

The diagram below shows the evolution of the modern horse (*Equus caballus*).



Define the term 'evolution'.

[1 mark]

[1 mark]

Question 1b

b)

State the name of the mechanism which drives evolution.

[1 mark]

[1 mark]

Question 1c

c)

There are several sources that provide evidence for evolution, such as selective breeding.

List **three** other sources of evidence for evolution.

[3 marks]

[3 marks]

Question 1d

d)

State **two** visible differences between *Eohippus* and modern horses.

[2 marks]

[2 marks]

Question 2a

a)

Two populations of cluster pine trees (*Pinus pinaster*) grew on opposite sides of a large mountain range. After many generations, scientists attempted to cross breed individuals from the two populations with each other but could not succeed. The scientists concluded that speciation occurred between the two populations.

Define the term 'speciation'.

[1 mark]

[1 mark]

Question 2b

b)

State **two** reasons why speciation occurred between the two populations of pine trees.

[2 marks]

[2 marks]

Question 2c

c)

Islands will very often contain many species that are endemic to those regions.

Describe a possible reason for this occurrence.

[2 marks]

[2 marks]

Question 3a

a)

The blackworm (*Lumbriculus variegatus*) is a species of worm native to North America and Europe. Their habitat includes marshes, swamps and ponds and they are a popular food source for fish kept in aquariums. Blackworms have a very unique way of reproducing, the segments that make up its body are able to regenerate into a complete individual on its own. Sexual reproduction is very rare in these worms.



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i)

State the main source of variation in a blackworm population.

[1 mark]

ii)

List **two** other sources of variation in a population.

[2 marks]

[3 marks]

Question 3b

b)

The blackworm in the image above grew a second tail, presumably due to an injury sustained on the first one. Its ability to regenerate body parts can be considered a useful adaptation.

i)

Define the term 'adaptation'.

[1 mark]

ii)

State the use of the regeneration abilities of the blackworm as an adaptation.

[1 mark]

[2 marks]

Question 3c

c)

It takes a very long time for blackworms to reach sexual maturity and they need to be of a large body size before they reach this stage of their development, which typically only occur in their natural habitat. Shorter blackworms will reproduce asexually by fragmentation which occurs at a much higher rate than sexual reproduction. In laboratory settings, the worms are often used in experiments and need to be replaced frequently.

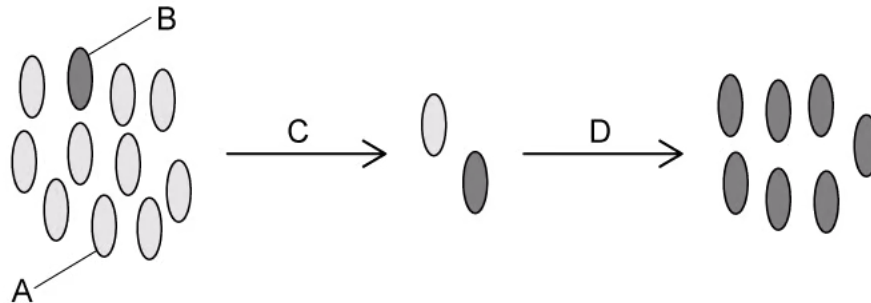
State the effect it would have on the body size of a blackworm population taken from a natural habitat, if they were kept in laboratory settings for a period of time.

[1 mark]

[1 mark]

Question 4a

a)
The following diagram illustrates the development of antibiotic resistance in bacteria due to a mutation that occurred in a non-resistant population.



Label the bacteria that are present at **A** and **B**.

[2 marks]

[2 marks]

Question 4b

b)
State the selection pressure that is applied at **C**.

[1 mark]

[1 mark]

Question 4c

c)
The mutation for antibiotic resistance is passed on to other bacteria at point **D**.

List **one** of the processes by which this could be done.

[1 mark]

[1 mark]

Question 4d

d)

State **one** strategy that could be used to reduce the rate at which resistance evolves in bacteria.

[1 mark]

[1 mark]

Question 5a

One mark is available for clarity of communication throughout this question.

a)

Selective breeding has played an important role in the domestication of wild plant and animal species.

State **three** examples of selective breeding in agriculture, along with the improved characteristics of each.

[3 marks]

[3 marks]

Question 5b

b)

Outline the process of selective breeding.

[6 marks]

[6 marks]

