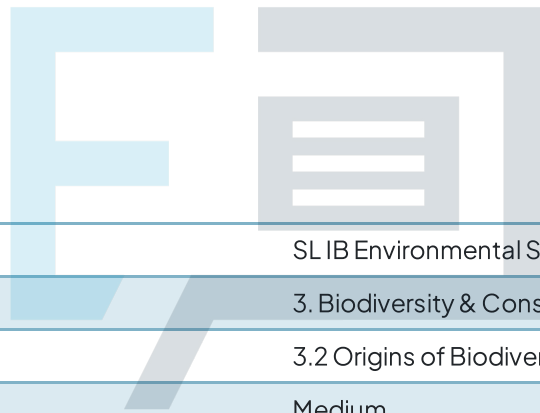




## 3.2 Origins of Biodiversity

### Question Paper



Course	SL IB Environmental Systems & Societies (ESS)
Section	3. Biodiversity & Conservation
Topic	3.2 Origins of Biodiversity
Difficulty	Medium

# Exam Papers Practice

To be used by all students preparing for  
SL IB Environmental Systems & Societies (ESS)  
Students of other boards may also find this useful

### Question 1a

A group of biologists conducted an investigation on a remote archipelago (a collection of islands) in the Pacific Ocean. A species of mouse lives on these islands without any natural predators. The biologists measured the claw length of a large number of these mice.

On half of the islands, a species of snake was accidentally introduced that preys on the mice but that cannot climb trees. Several years after the snakes were introduced the biologists returned and found that on the islands with snakes, the claw length of the mice had changed. Some had shorter claws, enabling them to run faster, while others had longer claws, enabling them to climb trees.

Suggest the benefit to the scientists' investigation of there being islands without any snakes present.

[2 marks]

### Question 1b

When the biologists conducted the investigation in part (a), flooding of the islands was very rare. Now, due to climate change, flooding of the islands occurs more regularly. This flooding can regularly wipe out large numbers of ground-living species.

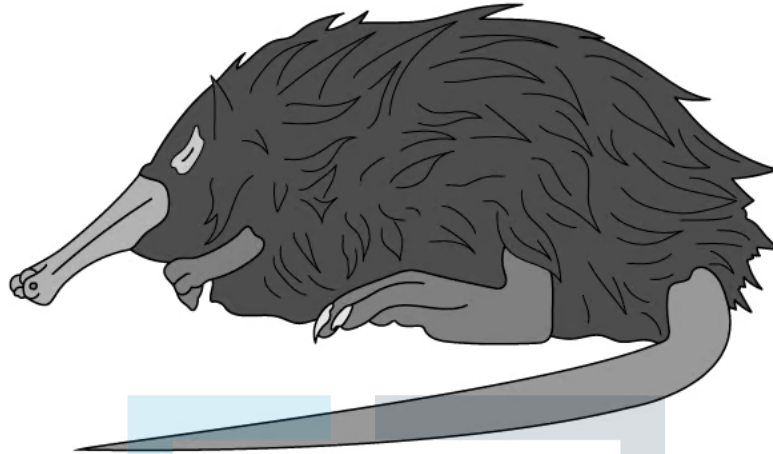
Using this information and the information from part (a), explain how the claw length of the mice on the islands are likely to be changing now.

[3 marks]

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### Question 2a

The Pyrenean desman (*Galemys pyrenaicus*) is a small, semi-aquatic, globally threatened mammal related to moles and shrews. It lives in the Pyrenees, a mountain range between France and Spain, and can be seen in the image below.



Outline two adaptive features of the Pyrenean desman.

[2 marks]

### Question 2b

During a study that lasted many years, scientists found that the number of desman travelling from the northern population to the southern side of the mountain range was extremely low. The scientists suspect that the original desman species may have split into two different species.

Explain how the original desman species may have split into two separate species.

[3 marks]

### Question 3

Describe the overall changes in global rates of extinction over time.

[3 marks]

### Question 4a

The apple maggot fly (*Rhagoletis pomonella*) is a species of fruit fly that lay their eggs on apples. As a result of this, they are often found in apple orchards where they can cause much damage to apple yields. Scientists studied two populations of apple maggot flies from orchards that were separated by a busy highway. They found that flies from the two populations had difficulty breeding successfully when kept in close confinement.

Suggest a reason for this observation.

[3 marks]

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### Question 4b

Even though nylon wasn't invented until the 1940s, bacteria were soon discovered that could degrade nylon. The bacterium, *Paenarthrobacter ureafaciens*, has special enzymes that allow it to metabolise nylon and use it as an energy source. This is a very simple example of natural selection.

i)

Describe how organisms can evolve through the process of natural selection.

The presence of an antibiotic can act as a selection pressure on bacterial populations.

[4]

ii)

Explain what selection pressure means in this context.

[2]

[6 marks]



# Exam Papers Practice