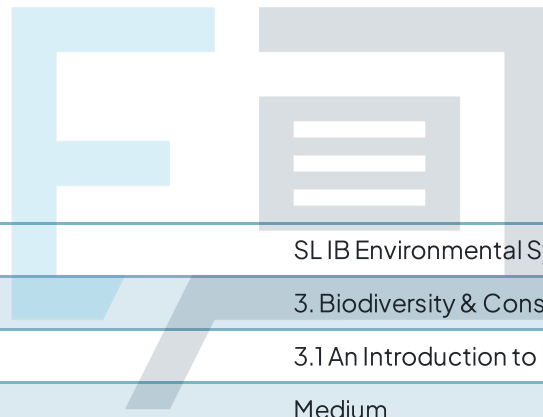




# 3.1 An Introduction to Biodiversity

## Question Paper



Course	SL IB Environmental Systems & Societies (ESS)
Section	3. Biodiversity & Conservation
Topic	3.1 An Introduction to 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

Explain the non-human factors contributing to the overall biodiversity of an ecosystem.

[4 marks]

### Question 1b

Compare and contrast *species diversity* and *species richness*.

[2 marks]



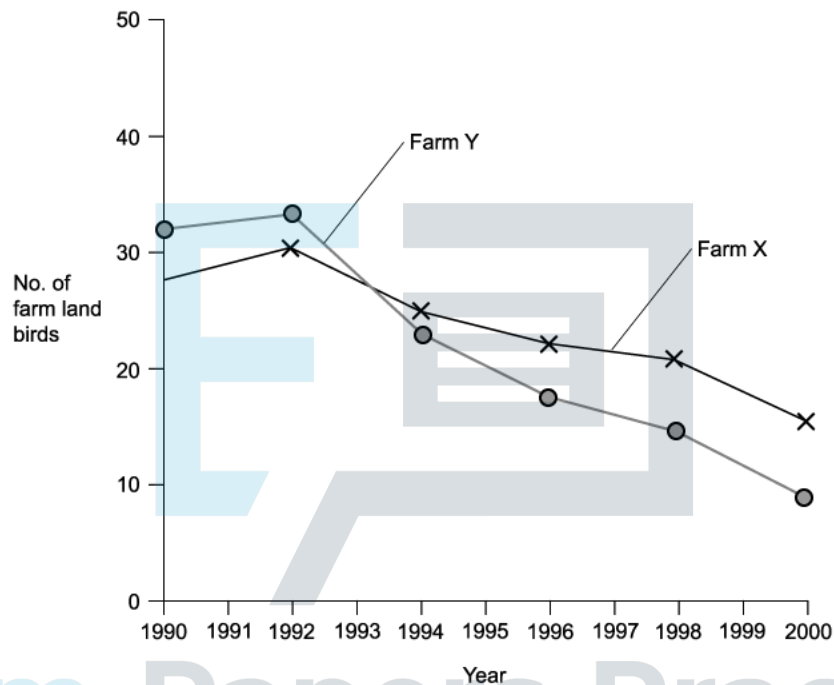
# Exam Papers Practice

### Question 2

Farmers can plant their crops at different times throughout the year. Traditionally crops were planted in April and harvested in September. However, in modern times farmers have switched to planting their crops in September and harvesting in June/July.

Scientists decided to investigate the effect that the change in planting time had on the number of farmland birds over 10 years. The scientists counted the number of farmland birds found within a 1km radius of farm X that plants its crops in April, and within a 1km radius of farm Y that plants its crops in September.

The figure below shows the data they collected.



i) Describe the results seen in the figure above.

In recent years, farmers have merged grazing fields together by removing hedgerows, This has resulted in a decline in the diversity of farmland birds.

[2]

ii) Explain why.

Organic farms do not use any chemical insecticides.

[2]

iii) Suggest what effect organic farming would have on the number of farmland birds. Explain your answer.

[2]

[6 marks]

**Question 3a**

Distinguish between species diversity and genetic diversity.

[2 marks]



Exam Papers Practice

### Question 3b

A biology teacher investigated the different species of insects found in a grassy meadow and in a nearby farmed field. The insects were collected using traps at randomly chosen sites both in the grassy meadow and in the farmed field. The table below shows the data collected.

Insect species	Number of individuals of each species	
	Farmed field	Grassy Meadow
Black aphid	230	0
Green aphid	0	569
Dingy Skipper butterfly	0	21
Green Lacewing	7	9
Brown Lacewing	0	37
<b>Total number of organisms of all species</b>	237	646

i) Predict whether the species diversity of the grassy meadow will be higher or lower than the species diversity of the farmed field.

Explain your answer.

[2]

ii) A student stated that the experiment suggested farming caused a reduction in species diversity.

Evaluate this statement.

[2]

Exam Papers Practice [4 marks]

### Question 4a

Fertilisers are commonly used today by most farmers as they help to increase crop yield and profit. If it rains shortly after fertilisers are applied to a field then some of the fertiliser can enter nearby water sources as runoff.

A conservationist investigated the effect that runoff fertiliser from a nearby farm had on the distribution of organisms living in a stream. At the point where fertiliser had entered the stream, she found a high density of specific organisms but a low index of diversity.

Suggest how fertiliser contaminating the stream could explain their findings.

[2 marks]

### Question 4b

The conservationist moves further away from the farm to take further samples.

i)  
Predict how the index of diversity will change. Justify your answer.

The conservationist wanted to use their findings to take action against the local farm. However, the farmer's lawyer argued that the scientific methods of the conservationist were not rigorous enough to conclude that runoff fertiliser was affecting species richness in the nearby stream. He demanded that more samples at random locations needed to be taken.

[2]

ii)  
Explain the importance of taking a large number of samples at random sites.

[2]

[4 marks]