

Unit 3 Sustainability & Interdependence

Key Area 7 & 8 Components and Threats to Biodiversity

1.

- (a) The gharial (*Gavialis gangeticus*) is a critically endangered fish-eating crocodile species which lives in north India.

Present day gharial populations have a lower genetic diversity than in the past.

- (i) Give **one** component of genetic diversity.

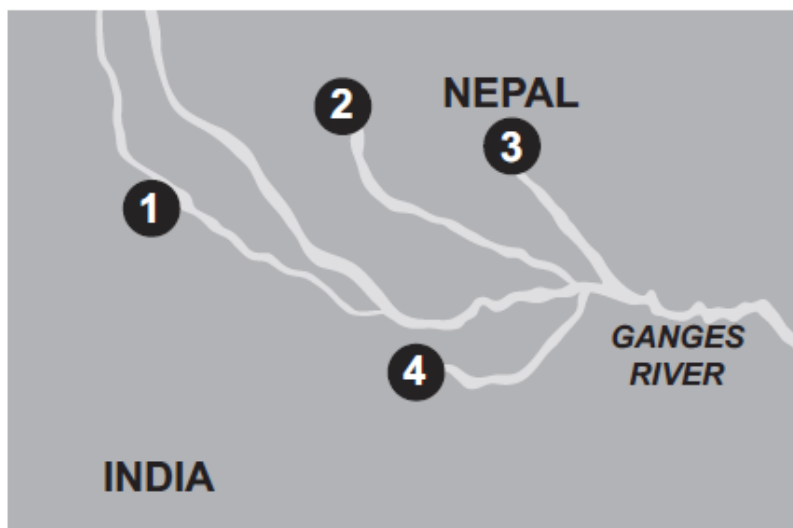
1

- (ii) Explain why low genetic diversity increases the risk of a species becoming extinct.

2

- (b) The gharial was formerly distributed evenly along the Ganges river and its main tributaries in north India but its range has been reduced by pollution which has destroyed parts of their habitat.

The map shows the Ganges river with the locations of four remaining isolated populations numbered 1–4.



- (i) Give the term used to describe the process which has restricted the gharials to these four isolated areas.

1

- (ii) Suggest **one** measure which could be taken to avoid extinction of the gharial in north India.

1

2.

The numbers of plants of five different species present in two plant communities were counted.

Community X was grazed by deer.

Community Y had deer excluded by fences.

The results are shown in the table below.

<i>Plant species</i>	<i>Number of plants present</i>	
	<i>Plant community X</i>	<i>Plant community Y</i>
1	300	40
2	325	48
3	341	1431
4	319	32
5	315	49

Based on the information given, which comparison of plant community X with community Y is correct?

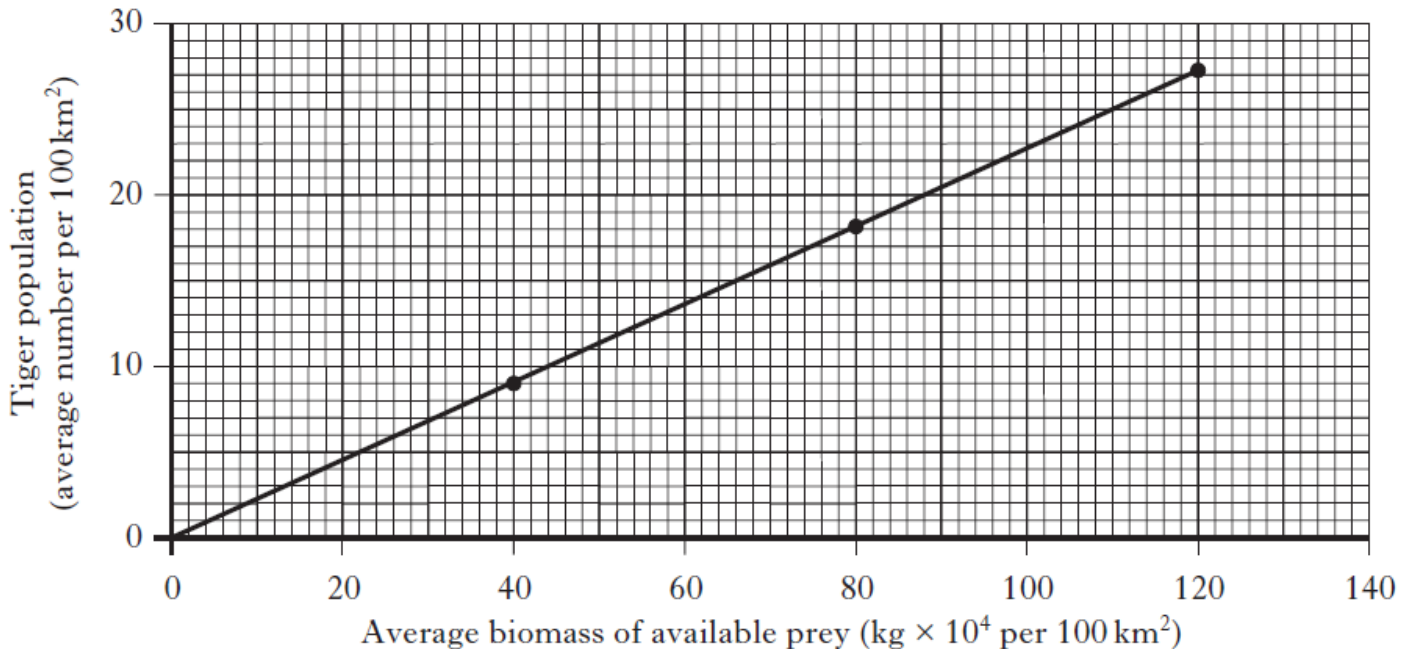
In comparison with plant community X, community Y has

- A the same species richness but a lower species diversity
- B the same species richness and a higher species diversity
- C different species richness but lower species diversity
- D different species richness and higher species diversity.

3.

Asiatic tiger populations are monitored because the species is now endangered. One of the threats to tiger survival is reduction in prey numbers.

The graph below shows the relationship between the average population of tigers and the average biomass of their prey in their Asian habitats.



- (a) (i) Give the average tiger population per 100 km^2 that could be supported by an available prey biomass of $110 \times 10^4 \text{ kg}$ per 100 km^2 .

_____ tigers

1

- (ii) Calculate the increase in average number of tigers per 100 km^2 as the available prey biomass increases from 40×10^4 to $80 \times 10^4 \text{ kg}$ per 100 km^2 .

Space for calculation

_____ tigers 1

- (iii) From the graph, predict the average prey biomass which would be required to support a population of 30 tigers per 100 km^2 .

Space for calculation

_____ kg per 100 km^2 1

- (b) Habitat fragmentation has forced tiger populations into small, scattered areas of remaining habitat. The creation of habitat corridors can reduce the impact of habitat fragmentation.

Give **two** ways by which the creation of habitat corridors can reduce the impact of habitat fragmentation to tiger populations.

1 _____

2 _____

2

4.

The Earth has experienced five major mass extinction events as shown in the table below.

<i>Extinction event</i>	1	2	3	4	5
<i>Approximate date</i> (millions of years before present)	445	365	250	200	65
<i>Percentage of animal families becoming extinct</i>	50	30	60	35	50

- (a) Identify the **two** events which were separated by the greatest time period. Tick (✓) the correct box.

Events 1 and 2

Events 2 and 3

Events 3 and 4

Events 4 and 5

1

- (b) Give the type of evidence which confirms that these extinction events have occurred.

1

(d) The present rate of species extinction is higher than the natural background rate due to ecosystem degradation brought about by human activity.

Complete the table below to show how human activities are related to ecosystem degradation.

<i>Human activity</i>	<i>Effect of activity</i>	<i>Ecosystem degradation resulting from activity</i>
	habitat fragmented	size of habitat fragments insufficient for survival of certain species
burning of fossil fuels		melting of polar ice destroys habitat for certain species

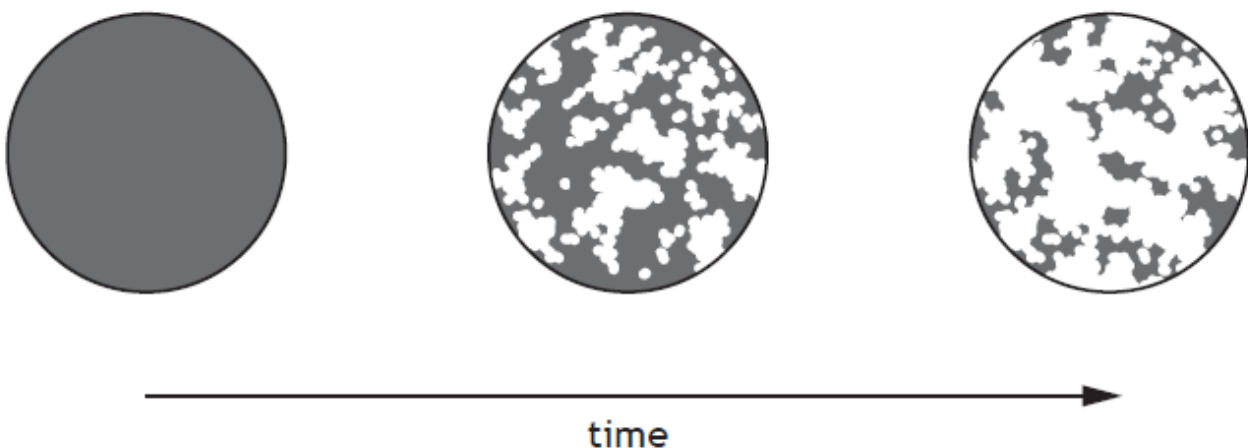
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5.

The biodiversity and the genetic diversity of individual species are affected when fragments of woodland become isolated.

The diagram below illustrates habitat fragmentation of an area of woodland over time.

The shaded areas represent woodland.



(a) (i) Name one component of genetic diversity.

1

5 a continued

- (ii) Suggest a reason why a decrease in genetic diversity of an individual species can lead to local extinctions within habitat fragments.

1

- (b) Suggest how habitat edge species might affect interior species as the habitat fragments become smaller.

1

- (c) Habitat corridors can be created to remedy habitat fragmentation.

- (i) State what is meant by the term “habitat corridor”.

1

- (ii) Explain how a habitat corridor can increase biodiversity after local extinction.

1
