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Student number

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Name _____

Date _____

Attempt/Time taken _____

GCSE BIOLOGY

Topic Paper: 6.2 Variation and evolution
Part 2

Time allowed: 35 minutes

Materials

For this paper you must have:

- the Periodic Table/Data Sheet, provided as an insert (enclosed)
- a ruler with millimetre measurements
- a calculator, which you are expected to use where appropriate.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- All working must be shown.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The Periodic Table/Data Sheet is provided as in insert.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions you need to make sure that your answer:
 - is clear, logical, sensibly structured
 - fully meets the requirements of the question
 - shows that each separate point or step supports the overall answer.



29 Marks



Q8. There is a large amount of evidence that evolution is taking place.

(a) Scientists are uncertain about how life started on Earth.

Explain why.

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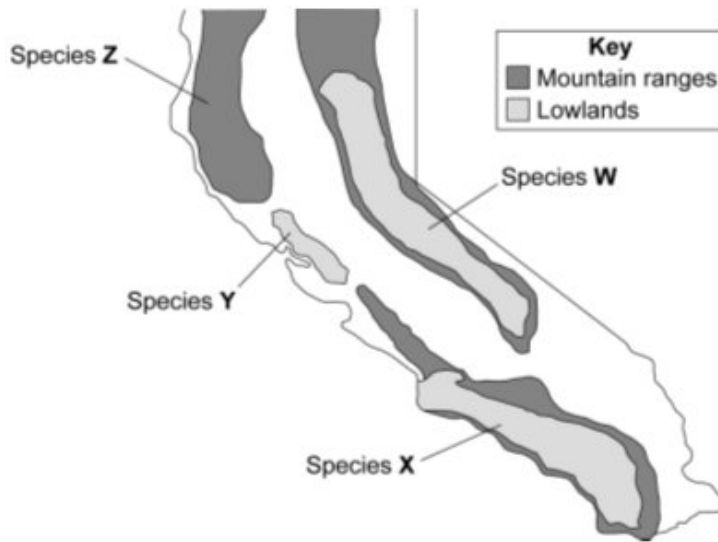
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(2)

(b) Salamanders are terrestrial amphibians.

The diagram shows the distribution of four different species of salamander in a country.



Questions continue on the next page



Originally, there was only one species of salamander in the country.

Suggest an explanation for the development of the four different species.

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(5)
(Total 7 marks)

Q9. (a) How do fossils provide evidence that species alive today have evolved from simpler organisms?

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(3)



(b) The photographs show two species of gull.

Herring gull (*Larus argentatus*)



By Ken Billington (Own work) [CC-BY-SA-3.0],
via Wikimedia Commons

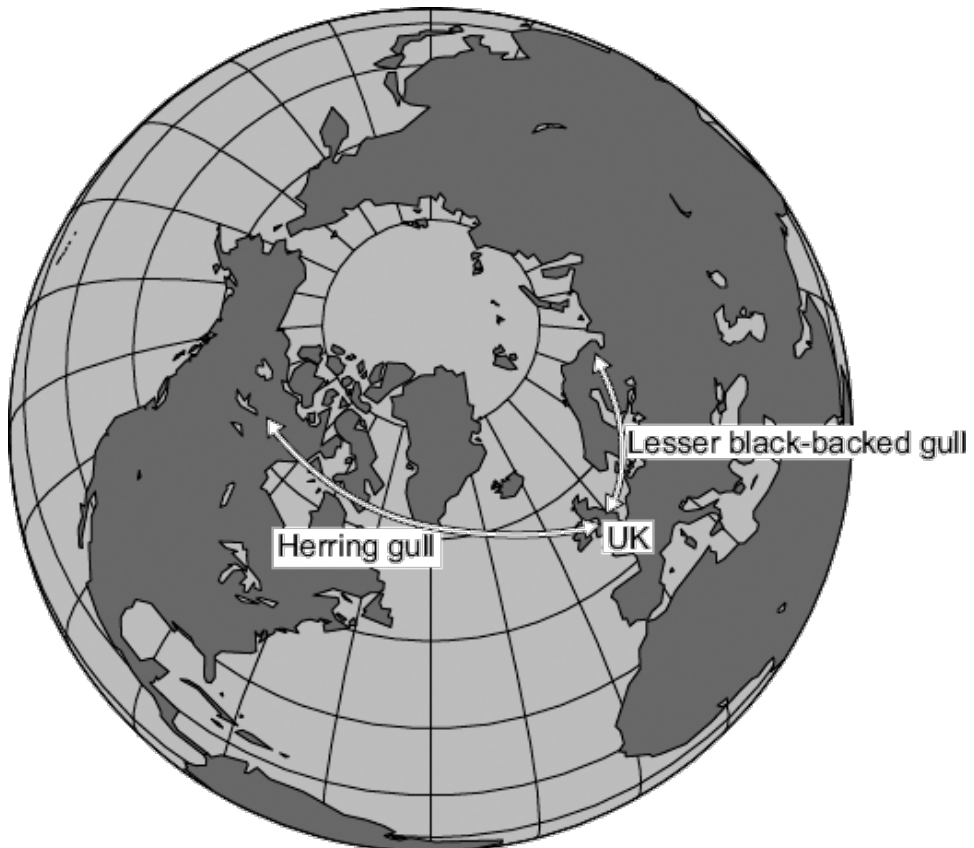
Lesser black-backed gull (*Larus fuscus*)



By Andreas Trepte (Own work) [CC-BY-SA-2.5],
via Wikimedia Commons

Both species are now found in the UK but the two species cannot interbreed with each other. Scientists believe that these two species have evolved from a common ancestor.

The map on the next page shows a view of the Earth from above the North Pole. The map also shows where these two species are found.





Suggest an explanation for the development of these different species.

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(6)
(Total 9 marks)

Q10. The photographs show the flowers of two closely-related species of plant.

Species A



Species B



Images: © iStock/Thinkstock

The drawings show chromosomes from one cell in the root of each plant during cell division.

Species A



**One
chromosome**

Species B



**One
chromosome**

(a) The drawings show that each chromosome has two strands of genetic material.

(i) How does a chromosome become two strands?

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(1)

(ii) Explain why each chromosome must become two strands before the cell divides.

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(2)

(b) For sexual reproduction, the plants produce gametes.

(i) Name the type of cell division that produces gametes.

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(1)



- (ii) How many chromosomes would there be in a gamete from each of these two plant species?

Species A **Species B**

(1)

- (iii) It is possible for gametes from **Species A** to combine with gametes from **Species B** to produce healthy offspring plants.
How many chromosomes would there be in each cell of one of the offspring

plants?

(1)

- (c) (i) Look back at the information at the start of the question and the information from part (b).

What evidence from these two pieces of information supports the belief that **Species A** and **Species B** evolved from a common ancestor?

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(2)



- (ii) For successful gamete production to take place, chromosomes that contain the same genes must pair up.

The drawings showing the chromosomes of **Species A** and of **Species B** are repeated below.



The offspring plants cannot reproduce sexually.

Suggest an explanation for this.

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(2)
(Total 10 marks)

Q11. *Howea forsteriana* and *Howea belmoreana* are two species of palm tree.

The two *species* grow together on a small island in the South Pacific.

- (a) What is meant by the term *species* ?

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(2)



(b) The table gives some information about these two species of palm tree.

	<i>Howea forsteriana</i>	<i>Howea belmoreana</i>
Optimum pH of the soil for growth of the palm tree	pH 8	pH 6
Height above sea level of most common habitat	30 to 60 metres	above 120 metres
Month when most palm trees flower	October	December
Method of pollination	Wind carries pollen	Wind carries pollen

Scientists believe that these two species of palm tree began to evolve from a single species over 2 million years ago.

Suggest how these two different species developed.

In your answer you should use information from the table and your own knowledge.

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(5)
(Total 7 marks)