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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 2 Science, 2008

90772 Describe the factors and processes involved in the evolution of New Zealand's plants and animals

Credits: Four
9.30 am Thursday 20 November 2008

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–7 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

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Achievement Criteria

Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe the factors and processes involved in the evolution of New Zealand's plants and animals. ☐	Explain the factors and processes involved in the evolution of New Zealand's plants and animals. ☐	Discuss the factors and processes involved in the evolution of New Zealand's plants and animals. ☐

Overall Level of Performance ☐

You are advised to spend 40 minutes answering the questions in this booklet.

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QUESTION ONE: THE COASTAL HEBE OF NEW ZEALAND (*Hebe elliptica*)

Many *Hebe* species evolved in New Zealand from a founder population that arrived from Australia. The coastal *Hebe* is considered to be a New Zealand endemic species.

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http://www.habitas.org.uk/flora/images/big/33887.jpg

(a) Describe what the term "endemic" means.

(b) Describe how the founder population of the coastal *Hebe* (*Hebe elliptica*) came to New Zealand from Australia.

(c) Plants in the coastal environment often have limited fresh water and are exposed to high winds and high salt levels.

Discuss how the coastal environment would have acted as a selection pressure in the evolution of the coastal *Hebe* from its original founder population.

(d) Discuss how the following processes affected the evolution in New Zealand of the coastal *Hebe* species from the founder population:

- founder effect
- differential selection pressure
- genetic isolation.

QUESTION TWO: EVOLUTION OF THE SHORT-TAILED BAT OR PEKAPEKA (*Mystacina tuberculata*)

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Rod Morris and Peter Hayden, *Wild South* (Dunedin: HarperCollins, 1995), p 93.

Evidence suggests that the ancestors of the short-tailed bat evolved in Australia about 54 million years ago. They arrived in New Zealand about 20 million years ago. They have since adapted to a unique lifestyle in New Zealand, where they forage for invertebrate food amongst the leaf litter on the forest floor, along fallen logs, and up and down tree trunks. Such foraging behaviour is unheard of in any other bat species in the world.

(a) Use **competition** and / or **predation** to explain how the short-tailed bat developed its unique lifestyle in New Zealand.

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(b) The short-tailed bat is at risk from introduced species and forest removal.

Discuss how **introduced species** and **forest removal** may influence the population and hence the **future evolution** of the short-tailed bat in New Zealand.

Question Three is on the following page.

QUESTION THREE: MUTATIONS AND THE PROCESSES OF EVOLUTION

(a) Mutations are changes in an individual's DNA.

Explain how mutations can cause changes in individuals that can be passed on to the next generation.

(b) Discuss how mutations in individuals can affect the gene pool and hence lead to a new species.

Extra paper for continuation of answers if required.
Clearly number the question.

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Question number