

This assessment is based on a now-expired version of the achievement standard and may not accurately reflect the content and practice of external assessments developed for 2024 onwards.

92022Q



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 1 Chemistry and Biology RAS 2023

92022 Demonstrate understanding of genetic variation in relation to an identified characteristic

Credits: Five

PILOT ASSESSMENT

ASSESSMENT TASK

| Achievement | Achievement with Merit | Achievement with Excellence |
|---|--|---|
| Demonstrate understanding of genetic variation in relation to an identified characteristic. | Explain genetic variation in relation to an identified characteristic. | Evaluate genetic variation in relation to an identified characteristic. |

Refer to this document to respond to the task for Chemistry and Biology RAS 92022.

Check that this document includes page 2.

INSTRUCTIONS

Produce one report with your answers to both parts (a) and (b).

Your report can be written or oral. Recommended length: 800 words or 3–4 minutes of audio/video.

TASK

(a) For this part, use **a named species and characteristic you have studied**. You should ensure there is a gene coding for a single characteristic and a known mutation in the gene you can discuss.

Discuss the effect of genetic variation on resilience in populations/species.

In your answer, you should include discussion of:

- sexual reproduction and mutation, with a description of each term
- how the processes of mutation and sexual reproduction each contribute to genetic variation
- the differences in genotype and/or phenotype within your named species, and give evidence of this variation (for example, data from gene tracking studies)
- the importance of genetic variation to the population/species you studied.

(b) Kākāpō used to be common in Aotearoa New Zealand but numbers declined rapidly after predators were introduced.

By the mid-1990s, there were hardly any kākāpō left.

There were:

- approximately 50 kākāpō on Rakiura/Stewart Island
- one kākāpō, called Richard Henry, in Te Rua-o-Te-Moko/Fiordland (in lower Te Waipounamu/South Island).

Conservation scientists took these kākāpō to live on safe, predator-free islands.



Adult male kākāpō

All kākāpō were very similar in both phenotype and genotype. Microsatellite DNA markers, specifically developed for kākāpō, showed almost no genetic variation between almost all kākāpō when using a genetic analysis.

One individual (Richard Henry) did show variation when using the same genetic analysis. Scientists began a breeding programme where other kākāpō were bred with Richard Henry.

Evaluate the effectiveness of genetic tracking for the conservation of the kākāpō.

In your answer you should include discussion of:

- why it was important for the scientists to have genetic information from the kākāpō
- how the data about genetic relationships may have informed the breeding programme
- next steps you would recommend for kākāpō conservation, in relation to genetic variation.