



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

# **Scholarship, 2005**

## **Biology** **93101**

### **National Statistics**

### **Assessment Report**

## Biology, Scholarship, 2005 93101

### National Statistics

No. Scholarship Results	Results			
	Outstanding	Scholarship	Scholarship	
	No. Awards	% of L3 Cohort	No. Awards	% of L3 Cohort
163	17	0.2%	146	1.9%

### Commentary

The 2005 scholarship examination provided four question opportunities for candidates. From these, one allowed candidates to achieve at scholarship level (six marks) while in the other three questions they could provide evidence towards outstanding performance (eight marks). An attempt was made to design questions where the mark values would equate to similar times. Suggested times were given on the front cover, which should have given candidates a guide as to how much writing they should do for each question.

Many scholarship candidates only have surface knowledge of the ideas they are trying to explain and lack the skills to write concise, well-reasoned discussions. Candidates often failed to gain marks for their answer because they were repetitive, used circular reasoning, or had errors/gaps in their understanding of biological concepts and processes. Many candidates were out of their depth attempting the scholarship exam.

Success in Scholarship demands high literacy skills. Candidates with poor language skills are typically unable to express themselves sufficiently to reach the standard. Candidates should spend time using the pages provided to plan answers that address the question asked and follow the question structure when providing an answer. Answers do not need long introductions that simply restate the information in the question.

### The best-performing candidates most commonly demonstrated the following skills and / or knowledge:

- sound, comprehensive and accurate knowledge of biological concepts and processes. Answers demonstrated a depth and breadth of biological understanding
- critical thinking skills. Candidates were discerning when analysing the question and the resource information provided, and in selecting appropriate biological knowledge to answer the question
- coherent, logical and precise answers that got straight to the point without restating the question or including irrelevant or superfluous information
- use of appropriate terminology, avoiding irrelevancies and generalisations.

Specific questions:

In Question 1 candidates:

- understood the concept of selective breeding and/or were able to use their knowledge of Mendelian genetics to explain how to produce a population of Munchkin cats
- could accurately and concisely describe the techniques of transgenesis and/or cloning as they would be used in cats
- could comprehensively compare and contrast the advantages and disadvantages of both concepts in the creation of a new breed and comment on their effectiveness.

In Question 2 candidates:

- could comprehensively compare and contrast the behaviours exhibited by social animals rather than describe different animal groups
- identified and described key behaviours, supported this with appropriate examples linked to the survival of the species, and contrasted these behaviours in different animal groups
- compared the ways different animal groups displayed these behaviours.

In Question 3 candidates:

- clearly and accurately described evolutionary processes
- used appropriate, named Hebe species to support each concept.

Note: A definitive correct description of the actual evolutionary history of the Hebe was not expected and could not have been expected from the information given. However, the data supplied could be used to support each concept in a reasoned and biologically accurate way.

**The following skills and / or knowledge were commonly lacking among candidates:**

- ability to provide answers containing more than basic definitions or knowledge
- ability to use their knowledge in a way that answered the question. These candidates tended to write down everything they perceived as relevant to the context of the question
- adequate use of biological vocabulary and language
- ability to use information given to craft an answer that addressed the requirements of the question, and to communicate this clearly
- understanding of the inter-relationships between all the key concepts of biology.

Specific questions:

In Question 1 candidates:

- were unaware of the genetic concept of selective breeding
- were unable to apply basic Mendelian genetic principles to realise that the mutated allele was dominant and the female cat heterozygous for the Munchkin condition
- did not know what a test cross was or did not recognise the need to conduct a test cross to establish homozygosity
- could not accurately describe the process of transgenesis and/or cloning. Many wrote pages of irrelevant information on PCR, gel electrophoresis, vectors etc
- could not select the appropriate cloning technique to use with cats
- could describe only the most superficial advantages/disadvantages of selective breeding and/or molecular biological techniques eg time

- struggled to apply their theoretical knowledge of the techniques to the practical situation eg stating that cloning can only produce female cats
- included irrelevant information such as the evolutionary implications of breeding Munchkin cats
- made weak comparisons or did not attempt them, and the effectiveness of the processes was not addressed or was done weakly.

In Question 2 candidates:

- had difficulty distinguishing social behaviour from other forms of behaviour and animals that displayed these behaviours
- selected animal groups, rather than behaviours, and described them
- wrote indiscriminately about behaviours or animals, hoping it was an aspect of social behaviour
- described individual behaviour eg territories, and/or behaviours of non-social animals eg fish schools
- showed incorrect understanding of the behaviours of social animals, such as describing the structure of bees and insect societies as a hierarchy
- did not attempt or made weak comparisons. Links to survival often consisted of a statement such as “therefore increasing the survival rate of the species”.

In Question 3 candidates:

- showed poor knowledge of the evolutionary processes required by the question, with many fundamental errors
- confused sympatric and allopatric evolution, and polyploidy and aneuploidy
- poorly understood the concepts of genetic drift and founder effect
- failed to illustrate their answers with named and appropriate Hebe species from the resource material provided
- described the selection pressures in theory, but failed to link this to an adaptive change in a Hebe
- ignored or failed to use the information in the resource material
- were unable to relate appropriately named examples to the concepts.