

Achievement Standard

Subject Reference Biology 3.1

Title Carry out a practical investigation into an aspect of an organism's ecological niche with guidance

Level 3 **Credits** 4 **Assessment** Internal

Subfield Science

Domain Biology

Registration date 1 November 2005 **Date version published** 1 November 2005

This achievement standard involves carrying out a practical biological investigation, with guidance, into an aspect of the ecological niche of an organism. It will involve planning the investigation, collecting and processing the data, interpreting the results, and presenting a report of the findings.

Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none">Carry out a practical biological investigation into an aspect of an organism's ecological niche with guidance.Present a report on the investigation.	<ul style="list-style-type: none">Carry out a quality practical biological investigation into an aspect of an organism's ecological niche with guidance.Present a report, with a discussion, on the investigation.	<ul style="list-style-type: none">Carry out a quality practical biological investigation into an aspect of an organism's ecological niche with guidance.Present a report, with a comprehensive discussion, on the investigation.

Explanatory Notes

- 1 This achievement standard is derived from *Biology in the New Zealand Curriculum*, Learning Media, Ministry of Education, 1994, p. 28, achievement objective 8.1 (b) and p. 38, Developing Scientific Investigative Skills and Attitudes in Biology.

- 2 Investigations must comply with animal ethic guidelines in Ministry of Education, *Caring for Animals: A Guide for Teachers, Early Childhood Educators, and Students*, Learning Media (Wellington:1999).
- 3 An *investigation* is an activity covering the complete process from planning to reporting and will involve the student in the collection of primary data related to the ecological niche of the organism. Primary data may relate to biotic and/or abiotic factors. The nature of the investigation could be the manipulation of variables (fair test) or the investigation of an interaction or relationship.
- 4 The investigation will be conducted with teacher guidance. This means the teacher is supporting the student throughout the investigation but the whole process is student driven. The teacher sets the parameters (such as organisms suitable for study, equipment available) and provides general information (such as resource suggestions or possible new directions).
- 5 It is essential that students develop an understanding of the ecological niche of the organism being studied before the investigation is carried out. This will allow the student to select a relevant aspect of the ecological niche to investigate. Student understanding can be developed through classroom teaching, research or practical investigation. Information about the ecological niche will also be used to write the introduction and discussion in the report.
- 6 A *practical biological investigation* will involve
 - a statement of the purpose – this may be an aim, testable question, prediction, or hypothesis related to the ecological niche of an organism
 - a method that describes:
 - for a fair test: the independent variable and its range, the measurement of the dependent variable and the control of some other key variables
 - or pattern seeking: the data that will be collected, range of data/samples, and consideration of some other key factors
 - collecting, recording and processing data (quantitative or qualitative) relevant to the purpose. Processing data would usually involve calculations or graphing
 - interpreting and reporting on the findings with a conclusion reached based on the processed data in relation to the purpose of the investigation.
- 7 A *quality practical biological investigation* enables a valid conclusion to be reached. A valid conclusion is relevant to the aim and justified by correctly processed data. This would normally involve:
 - a statement of the purpose – this may be an aim, testable question, prediction or hypothesis related to the ecological niche of the organism
 - a method that describes:
 - for a fair test: a valid range for the independent variable, the valid measurement of the dependent variable
 - for pattern seeking: a valid collection of data
 - how other variables will be controlled and/or how other factors that might influence the investigation will be taken into account

- collecting, recording and processing data (quantitative or qualitative) to enable a trend or pattern (or absence), relevant to purpose of the investigation, to be determined
- interpreting and reporting on the findings with a valid conclusion reached based on the processed data in relation to the purpose of the investigation.

8 The report will include:

- an introduction that summarises the ecological niche of the organism and links this to the purpose of the investigation
- the purpose of the investigation
- the final method used
- recorded observations, measurements and data
- processed data showing a trend or pattern
- a conclusion based on processed data relevant to the purpose of the investigation
- a reference list.

9 *A discussion* considers the significance of the results of the investigation in relation to the ecological niche of the organism.

10 *A comprehensive discussion* considers:

- the investigation as a whole
- the significance of the results in relation to the ecological niche of the organism and relevant scientific information
- the validity of the investigation in terms of either
 - the validity of the conclusion by using statistical methods such as mean and standard deviation, confidence intervals, standard error, or other appropriate test; or
 - the reliability of the data by consideration of factors such as how sources of error were eliminated, how limitations were overcome, or how the effects of bias were reduced.

Quality Assurance

- 1 Providers and Industry Training Organisations must be accredited by the Qualifications Authority before they can register credits from assessment against achievement standards.
- 2 Accredited providers and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.