



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

**Level 2, 2003**

**Biology: Describe concepts and  
processes relating to ecology (90461)**

**National Statistics**

**Assessment Report**

**Assessment Schedule**

**Biology: Describe concepts and processes relating to ecology (90461)****National Statistics**

Number of Results	Percentage achieved			
	Not Achieved	Achieved	Merit	Excellence
9,880	41.9%	49.2%	8.0%	0.9%

**Assessment Report**

Every candidate for a National Certificate of Educational Achievement examination paper is expected to:

- read the question and do what the question asks
- allow adequate time to complete answers
- be accurate: check and/or proofread
- use appropriate technical terms
- bring the correct equipment
- write and/or draw clearly
- use pen if work is to be eligible for reconsideration.

**General Comments**

Successful candidates demonstrated an ability to interpret and apply their knowledge to novel situations. Only the very best candidates displayed an ability to discuss the biological concepts. It is important to give relevant examples and to ensure that the full requirements of the question are answered. Explanations should not merely restate the question.

It is important for candidates to be able to express in their own words, straightforward definitions and descriptions of concepts and processes when addressing the requirements of the questions, eg the difference between terms such as antibiosis and parasitism.

## Assessment Schedule

### Biology: Describe concepts and processes relating to ecology (90461)

#### Evidence Statement

##### Achievement Criteria

	Achievement	Achievement with Merit	Achievement with Excellence
Criteria	Describe biological concepts and processes relating to ecology.	Explain biological concepts and processes relating to ecology.	Discuss biological concepts and processes relating to ecology.
Question	Evidence contributing to Achievement	Evidence contributing to Achievement with Merit	Evidence contributing to Achievement with Excellence
1(a)	Description of advantage of mimicking a bee, eg: protection / defence / appears harmful / appears unpalatable (warning idea needed).		
1(b)	Description relating to stratification, eg: range / different environmental conditions at different levels: light / temp / humidity / wind (ONE condition named) <b>or</b> Description relating to environmental conditions, eg: adaptations of plants at different levels.	Explanations of stratification, eg: each layer: changes the environmental conditions: provides conditions suitable for different plants: <b>TWO</b> examples explained, eg: temp – shading of canopy light – shade of canopy humidity – trapped by strata wind – reduced by canopy <b>or</b> reason for plant adaptations, eg: tolerance limits.	
1(c)	Description relating to the organisms OR the relationships, eg: described = fungus / orchid draws nutrients from beech tree fungus: parasite / saprophyte / decomposer orchid – fungus : parasitism / exploitation fungus - beech tree : mutualism <b>TWO</b> named/described descriptions needed	Explanation of reason for relationship, eg: The fungus parasite uses beech sap as food. Orchid obtains food from fungus/has no chlorophyll so must get nutrients via fungus. The fungus feeds on materials from the beech tree but it could also supply the tree with minerals. Exploitation explained <b>TWO</b> named/described relationships explained	Discussion of interrelationships, eg: The orchid has no leaves or chlorophyll, so has no way to make its own food. Therefore, it must rely on the fungus for food. The body of the fungus takes food from the roots of the beech tree, and supplies it to the orchid. (The fungus is able to live as a decomposer.) This may substitute for fungus=parasite NOT exploitation Discussion needed all <b>THREE</b> species to cover one aspect of each named relationship One further link than flow of materials, eg: orchid lacks chlorophyll/roots, fungus=decomposer.

Question	Evidence contributing to Achievement	Evidence contributing to Achievement with Merit	Evidence contributing to Achievement with Excellence
2(a)	<p>Description of TWO environmental conditions, eg:</p> <p>0: high light / higher temperature / higher wave action / higher oxygen level / lower pressure / interspecific competition (higher)</p> <p>60: low or no light / lower temperature / no wave action / lower oxygen level / higher pressure / interspecific competition (none / lower)</p> <p>Note: currents incorrect.</p>		
2(b)	<p>Description relating to intra-specific competition, eg:</p> <p>fewer (crayfish) outside (the reserve) / more (crayfish) inside (the reserve) / more restricted size range outside reserve</p> <p>Comparison of both areas needed.</p>	<p>Explanation relating to intra-specific competition, eg:</p> <p>fewer (crayfish) outside (the reserve) : less competition outside reserve : for food / hiding places / mates</p> <p>more (crayfish) inside (the reserve) : higher competition inside reserve : for food / hiding places / mates.</p> <p>more restricted size range outside reserve : higher competition : similar needs / lower competition : absence of large crayfish</p>	
2(c)	<p>Description relating to age structure or population numbers, eg:</p> <p>inside reserve more crayfish : population will increase</p> <p>fewer small crayfish outside reserve : population will decrease</p> <p>fewer large crayfish outside reserve : population will decrease</p> <p>inside the reserve wide range of different sized crayfish / high number of middle sized crayfish : population will increase</p> <p>inside the reserve wide range of different sized crayfish / high number of middle sized crayfish : population will decrease / population will stay the same.</p> <p>Clearly labelled diagrams are acceptable but must cover both areas and reasoning and discussion of future numbers must be clear.</p> <p>Characteristic from graph <b>ONE</b> area needed.</p>	<p>Explanation of impact of age structure on future crayfish numbers inside or outside the reserve, eg:</p> <p>...as more crayfish available to breed</p> <p>...none available to be recruited</p> <p>less available to breed / no larger highly reproductive crayfish / unfavourable male-female ratio</p> <p>...as more crayfish available to breed / more highly reproductive crayfish</p> <p>some may migrate outside the reserve / increased mortality.</p>	<p>Discussion of impact of age structure on future crayfish numbers inside and outside the reserve, eg:</p> <p>...more individuals will be recruited into population (idea)</p> <p>...reduce number of reproductive age in future</p> <p>less individuals recruited into population in future (idea)</p> <p>...more individuals will be recruited into population (idea)</p> <p>as the numbers of crayfish inside the reserve rise there will be more competition / plausible reason, eg increased predation.</p> <p>Reason given. May be <b>ONE</b> area only.</p> <p>Reason justified. <b>TWO</b> areas discussed.</p>

Question	Evidence contributing to Achievement	Evidence contributing to Achievement with Merit	Evidence contributing to Achievement with Excellence
3(a)	<p>Specification of TWO trophic levels of kingfisher, eg:</p> <p>Secondary / second order / 2<sup>o</sup> consumer / 2Y consumer <b>or</b> primary / first order / 1<sup>o</sup> / 1Y carnivore</p> <p><b>and</b> tertiary / third order / 3<sup>o</sup> / 3Y consumer <b>or</b> secondary / 2<sup>o</sup> carnivore / 2Y carnivore / top carnivore</p> <p><b>and</b> trophic level 3 and 4</p> <p>'3 and 4' incorrect</p>		
3(b)	<p>Description relating to importance of algae or sedge, or energy flow, eg:</p> <p>producers / autotrophs</p> <p>photosynthesis / food production</p> <p>supply food / energy.</p> <p>all other organisms are consumers / heterotrophs</p> <p>transform light → chem. energy.</p>	<p>Explanation of importance of algae and sedge in energy flow, eg:</p> <p>producers : energy entry into ecosystem</p> <p>producers : biomass : supports herbivores and carnivores</p> <p>no other organisms can produce food</p> <p>must consume alga/sedge as can't make own food.</p>	

### Judgement Statement

Judgement statements (formerly referred to as sufficiency statements) help students understand how their overall results for each standard were arrived at.

	Achievement	Achievement with Merit	Achievement with Excellence
Judgement	<p>Provides evidence of <b>four</b> description level answers in relation to ecology, ie</p> <p><b>4 × A</b></p>	<p>Provides evidence of <b>six</b> answers at description level or better in relation to ecology.</p> <p>At least <b>three</b> at explanation level or better, ie at least <b>3 × M</b>.</p>	<p>Provides evidence of <b>seven</b> answers at description level or better in relation to ecology.</p> <p>At least <b>four</b> at explanation level or better including <b>one</b> at discussion level, ie at least <b>1 × E</b>.</p>