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90461

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Level 2 Biology, 2005

90461 Describe concepts and processes relating to ecology

Credits: Three
2.00 pm Tuesday 15 November 2005

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 2–8 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.

For Assessor's use only	**Achievement Criteria**	
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe biological concepts and processes relating to ecology. ☐	Explain biological concepts and processes relating to ecology ☐	Discuss biological concepts and processes relating to ecology ☐
Overall Level of Performance ☐		

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

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QUESTION ONE: SANDY BEACHES

Pīngao is a native coastal sand dune plant that traps wind-blown sand in its leaf bases and root system. Pīngao stabilises sandy coasts and creates a habitat in which other native coastal plant species can settle and grow. The first plants that grow are low lying ground covers, then shrubs and later coastal trees including pōhutukawa and pūriri.

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Dunedin City Council leaflet

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Meg Bayley, *Patterns of Life*, Pearson Longman, Auckland 2005

(a) Give the **term** for this change in coastal plants over time from pīngao to pōhutukawa.

Marram grass is often found growing in the same habitat as pīngao. Marram grass grows more vigorously than pīngao under the same conditions. Marram grass traps sand more efficiently and has a root system that grows more vigorously.

(b) Explain the effect marram grass will have on pīngao growing in the same area of a sand dune.

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The sand scarab beetle lives in amongst pīngao and marram grass and eats the roots. The scarab beetle is active during the night and during the day it burrows deep into the sand. The female deposits large numbers of eggs singly amongst the roots of marram grass and pīngao.

(c) Describe THREE aspects of the **ecological niche** of the sand scarab beetle.

(d) Describe ONE **behavioural adaptation** of the scarab beetle and explain how this enables the sand scarab beetle to survive in the dune environment.

Behavioural adaptation:

Explanation:

QUESTION TWO: NEW ZEALAND NATIVE BEECH MISTLETOE

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The New Zealand mistletoe, *Peraxilla tetrapetala,* is a semi-parasitic plant that gains water and nutrients from its host plant, which remains unharmed. Mistletoe flowers provide birds with fruit and nectar. Parasitic insects live inside leaf tissue in growths called galls.

For the mistletoe flowers to be pollinated, they need to be opened by native birds such as the tui and the bellbird or a tiny native bee. The pollen is then transferred to the next flower that the birds or bee visits. Introduced animals have not yet learned how to open the mistletoe flowers, so cannot act as pollinators. Un-pollinated flowers will not produce seeds.

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University of Canterbury

(a) Name and describe two different **interspecific relationships** involving the mistletoe.

Relationship 1: _____

_____

_____

Relationship 2: _____

_____

_____

(b) Explain how the **mistletoe** is affected by the **other species** in each of the relationships given in your answer to part (a).

Relationship 1: _____

_____

_____

_____

Relationship 2: _____

_____

_____

_____

In recent years much of the native mistletoe has disappeared from many areas of New Zealand, especially from the North Island.

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(c) Discuss the **effect** the disappearance of mistletoe has on the **biodiversity** in these areas.

QUESTION THREE: FOOD WEBS

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Below is a model of the movement of carbon through the organisms in a food web in a sea area south of New Zealand.

The numbers in the figure below are the amounts of carbon transferred between organisms (millions of tonnes / year). Net primary production (phytoplankton growth) in this area generates organic matter containing about 115 million tonnes of carbon each year.

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Source: www.niwa.co.nz/pubs/wa/12-2/trophic#trophic1-large.jpg

(a) Describe how energy enters this food web.

(b) Explain why the amount of carbon transferred between organisms **decreases** as the trophic level increases in the food web.

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(c) Discuss the possible effects on this food web if commercial fishers increase the number of squid they catch in this region. Use information from the diagram to support your answer.

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

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Question number	