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90716

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

Level 3 Biology, 2005

90716 Describe animal behaviour and plant responses

Credits: Four
9.30 am 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 2–11 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 animal behaviour and plant responses in relation to environmental factors. ☐	Describe animal behaviour and plant responses in relation to environmental factors. ☐	Describe animal behaviour and plant responses in relation to environmental factors. ☐
	Explain animal behaviour or plant responses in relation to environmental factors. ☐	Discuss animal behaviour or plant responses in relation to environmental factors. ☐
Overall Level of Performance (all criteria within a column are met) ☐		

You are advised to spend 35 minutes answering the questions in this booklet.

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QUESTION ONE

The koekoeā or long-tailed cuckoo migrates between New Zealand and the Pacific Islands where it stays during our winter months. They lay their eggs in the nests of other birds. The host birds incubate the eggs and raise the young cuckoo. Adult cuckoos return to the Pacific Islands before their young are strong enough to migrate. The young cuckoos leave New Zealand some weeks later.

[FOR COPYRIGHT REASONS, THIS RESOURCE CANNOT BE REPRODUCED HERE. SEE BELOW.]

Barrie Heather and Hugh Robertson, *Field Guide to the Birds of New Zealand*, Viking, Auckland, 1996.

(a) Describe TWO methods that could be used by the cuckoo to navigate between the Pacific Islands and New Zealand.

(b) Explain how migration can provide a benefit for the long-tailed cuckoo.

(c) Discuss the effects the egg-laying behaviour of the cuckoo has on the cuckoo and the host birds.

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QUESTION TWO

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A set of experiments was carried out in a research laboratory to investigate growth responses in radicles (young roots).

The results of the experiments are shown below.

Malcolm Wilkins, *Plantwatching*, Macmillan, London, 1988, p 72.

Researchers believe that at least one chemical substance that inhibits cell growth is responsible for curvature in young roots.

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(a) Sketch a diagram to show the relative cell sizes in the region circled in **experiment A** after 6 hours.

(b) Compare the results of the two sets of experiments (A and B with C and D), and use your comparison to **justify** the survival advantage that the responses shown give to the plant.

QUESTION THREE

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Pūkeko are New Zealand wetland birds. During the breeding season, pūkeko live in groups within small defended areas that contain food, water and shelter.

Outside the breeding season, pūkeko gather in large feeding flocks.

[FOR COPYRIGHT REASONS, THIS RESOURCE CANNOT BE REPRODUCED HERE. SEE BELOW.]

Barrie Heather and Hugh Robertson, *Field Guide to the Birds of New Zealand*, Viking, Auckland, 1996.

(a) Describe the difference between a home range and a territory in relation to the pūkeko.

A group of pūkeko within a territory establish a linear hierarchy with an adult male heading the hierarchy and younger birds at the bottom.

(b) Explain how a linear hierarchy could benefit the group of pūkeko within a territory.

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Yr 13 Biology Student Resource and Activity Manual 2005, Biozone, Hamilton, 2005, p 195.

Aggressive behaviour between pūkeko often involves the bird holding its red beak up ready for attack, while in submissive behaviour its beak is lowered and the tail raised, exposing white feathers beneath.

(c) Young pūkeko are similar in colouring to the adults but lack the bright red beak of the adult birds. Analyse how the colouring of the young bird could benefit the **young bird** itself.

QUESTION FOUR

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The Cocklebur is a short-day plant.

(a) Describe how photoperiod affects flowering in a short-day plant.

(b) Explain how the plants benefit by flowering only in certain photoperiods.

The table below relates to an investigation into Cocklebur plants. Three groups of plants were set up, each plant having two branches. One branch (branch A) of each plant was exposed to continuous light. The other branch (branch B) was exposed to short-day lighting and had varying numbers of leaves removed.

[FOR COPYRIGHT REASONS, THIS RESOURCE CANNOT BE REPRODUCED HERE. SEE BELOW.]

Clegg C J and McKean D G, *Advanced Biology Principles and Applications*, John Murray, London, 2000.

(c) Discuss these results with respect to the **phytochrome** system of plants and the flowering of **short-day** plants.

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Note that Question Five is on Page 10.

QUESTION FIVE

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Box jellyfish can be found at some beaches.

A university research team is investigating the behaviour of box jellyfish. Early observations indicate that box jellyfish are active during the day but appear to 'sleep' on the sea floor at night, possibly controlled by a timing response. Box jellyfish seem to swim toward bright lights such as fishing boats at night.

(a) Describe the **orientation** response the box jellyfish are displaying when they swim toward light.

(b) Describe the **timing** response that may control the activity of box jellyfish.

(c) If the timing response is **endogenous**, describe and give reasons for what the researchers would observe if they kept the box jellyfish in constant light, temperature and saline conditions.

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

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Question number	