See back cover for an English translation of this cover

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91603M

916035

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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

Koiora, Kaupae 3, 2014

91603M Te whakaatu māramatanga ki ngā urupare a te tipu me te kararehe ki te taiao

9.30 i te ata Rāpare 13 Whiringa-ā-rangi 2014
Whiwhinga: Rima

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki ngā urupare a te tipu me te kararehe ki te taiao.	Te whakaatu māramatanga hōhonu ki ngā urupare a te tipu me te kararehe ki te taiao.	Te whakaatu māramatanga matawhānui ki ngā urupare a te tipu me te kararehe ki te taiao.

Tirohia mehemea e ōrite ana te Tau Ākonga ā-Motu (NSN) kei tō pepa whakauru ki te tau kei runga ake nei.

Me whakautu e koe ngā pātai KATOA kei roto i te pukapuka nei.

Ki te hiahia koe ki ētahi atu wāhi hei tuhituhi whakautu, whakamahia te (ngā) whārangi kei muri i te pukapuka nei, ka āta tohu ai i ngā tau pātai.

Tirohia mehemea kei roto nei ngā whārangi 2–21 e raupapa tika ana, ā, kāore hoki he whārangi wātea.

HOATU TE PUKAPUKA NEI KI TE KAIWHAKAHAERE HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

TAPEKE

MĀ TE KAIMĀKA ANAKE

© Mana Tohu Mātauranga o Aotearoa, 2014. Pūmau te mana.
Kia kaua rawa he wāhi o tēnei tuhinga e tāruatia ki te kore te whakaaetanga a te Mana Tohu Mātauranga o Aotearoa.

MĀ TE KAIMĀKA ANAKE

PĀTAI TUATAHI: TE WHANONGA O NGĀ TATAKĪ

E mōhiotia ana ngā tatakī, *Morus serrator,* he whakaputa uri ā-pūrei. I te wā o te raumati, ka kitea ngā pūrei manu nui i roto i ngā pūrei tatakī, e tino āraihia ana e ngā takirua whakaputa uri ō rātou ake kōhanga. Ēngari, kua kitea i roto i ngā mātai o nā tata nei ina haere ki te kimi kai i te moana, kāore aua manu e whakaputa i taua whanonga ārai rohe i ō rātou mahinga kai, me te aha i te nuinga o te wā ka noho motuhake mai ō rātou ake wāhi mahinga kai i te moana, e hāngai ana ki ō rātau ake pūrei ina whakakōpae ana i te whenua.

He tapu tēnei rauemi. E kore taea te tuku atu. Aata tirohia ki ngā kupu kei raro iho i te pouaka nei.

Ka whakaatu whanonga whai nōhanga ngā tatakī i te wā e whakakōpae ana i te whenua, ēngari kaua i te wā e kimi kai ana i te moana.

Steffi Ismar, http://nzbirdsonline.org.nz/species/australasian-gannet

Matapakihia ngā take e whakaputa whanonga ana ngā tatakī e ai ki ngā whakaahuatanga i runga ake.

I tō whakautu:

- whakaahuahia te whanonga whai nōhanga
- whakamahia ngā ariā koiora hei whakamārama he aha te whanonga whai nōhanga i whai painga urutau ai mō ngā tatakī
- parahautia ngā pūtake pea he aha i noho motuhake ai ngā tatakī ki ō rātou ake wāhi mahinga kai i te moana.

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QUESTION ONE: BEHAVIOUR IN AUSTRALASIAN GANNETS

Australasian gannets, *Morus serrator,* are known as colonial breeders. During the summer, large colonies of birds can be found within gannet colonies, where breeding pairs fiercely defend their individual nesting territories. However, recent studies have shown that when foraging at sea, the same birds show no territorial behaviour across their chosen feeding areas, and yet they appear to maintain largely separate foraging areas at sea, specific to the particular colonies they belong to when nesting on land.

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Gannets display territorial behaviour when nesting on land, but not when foraging at sea.

Steffi Ismar, http://nzbirdsonline.org.nz/species/australasian-gannet

Discuss the reasons why Australasian gannets appear to behave as described above.

In your answer:

- describe territorial behaviour
- use biological ideas to explain why the territorial behaviour provides adaptive advantages for the gannets
- justify possible reasons why the Australasian gannets appear to maintain separate foraging areas when at sea.

MĀ TE KAIMĀKA ANAKE

He wāhi anō mō tō whakautu i tēnei pātai kei ngā whārangi 6 me 7.

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There is more space for your answer to this question on pages 6 and 7.

MĀ TE KAIMĀKA ANAKE

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PĀTAI TUARUA: WHAKATAETAE I WAENGA I TE WITI ME TE KARAIHE RAI

He tipu kai hira te witi. He tarukino te karaihe rai i roto i ngā whīra witi. Nō te whānau pātītī te witi me te karaihe rai.

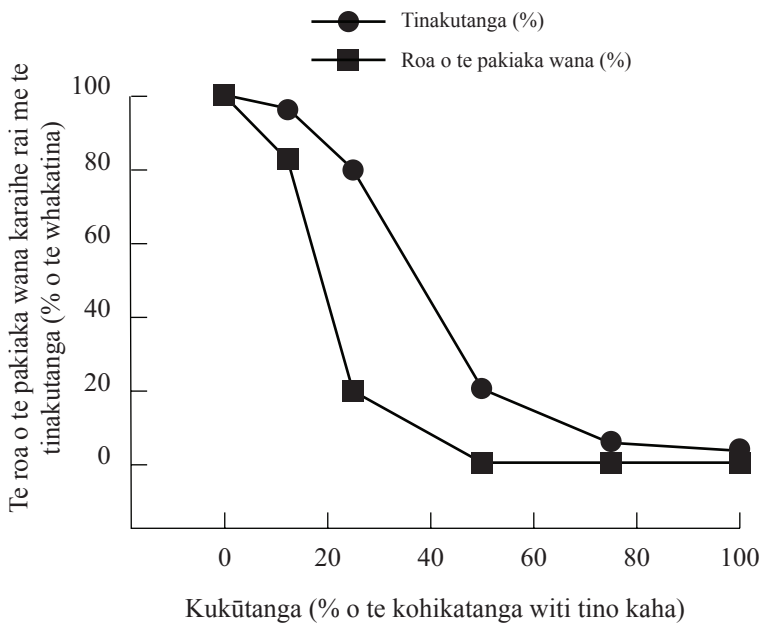
I tūhuratia e ngā tohunga pūtaiao o Ahitereiria tētahi āhuatanga o te whakataetae i waenga i te witi me te karaihe rai.

- I penupenutia[1] ngā tipu witi ka ranua ki te wai iheu.
- I memeha ngā matū memeha-wai i roto i ngā tipu penupenu ki te wai kia puta ai te kohikatanga tino kaha rawa.
- I whakahaerehia ētahi memehatanga o te kohikatanga tino kaha rawa.
- I whakaurua ngā kākano karaihe rai ki ia waimehatanga, ā, ka tuhia te ōrau i **tinakuhia** (i tīmata ki te tipu).
- Mēnā i tinaku ngā kākano, i inea anō te **roa o te wana** i muri i te 7 rā.
- He mea whakaatu ngā otinga hei ōrautanga o tētahi whakamātau whakatina.

He tapu tēnei rauemi. E kore taea te tuku atu. Aata tirohia ki ngā kupu kei raro iho i te pouaka nei.

Te karaihe rai i rō whīra witi.

http://www.arc.agric.za/uploads/images/5724_Fig%201.%20%20Ryegrass%20in%20a%20wheat%20field.jpeg



He mea urutau mai i: www.regional.org.au/au/asa/1998/6/139wu-1.gif

E whakaatu ana te kauwhata i ngā pānga o ngā kukūtanga rerekē o te kohikatanga witi ki te tinakutanga o ngā kākano karaihe rai me te roa o ngā pakiaka o ngā wana i tipu mai ai.

Matapakihia te putanga o tēnei whakamātau me ngā taunakitanga mō te witi me tana urupare ki tōna taiao.

I tō whakautu me kōrero koe mō te kauwhata ka:

- whakaahua i te pāhekohekotanga i waenga i te witi me te karaihe rai me tōna hiranga ki ngā kaipāmu witi
- whakataurite i te roa o ngā pakiaka o ngā wana karaihe rai me te tinakutanga, ki te kukūtanga o te kohikatanga witi
- āta whakamārama i te urupare i waenga i te witi me te karaihe rai e tohua ai e ngā otinga o tēnei whakamātau
- tātari i ngā otinga ka tuku whakaaro mō te āhua o te tuku painga urutau o tēnei urupare ki ngā tipu witi e tipu ana.

[1] nakunakuhia

QUESTION TWO: COMPETITION BETWEEN WHEAT AND RYEGRASS

Wheat is an important cereal crop. Ryegrass is a weed in wheat fields. Wheat and ryegrass both belong to the grass family.

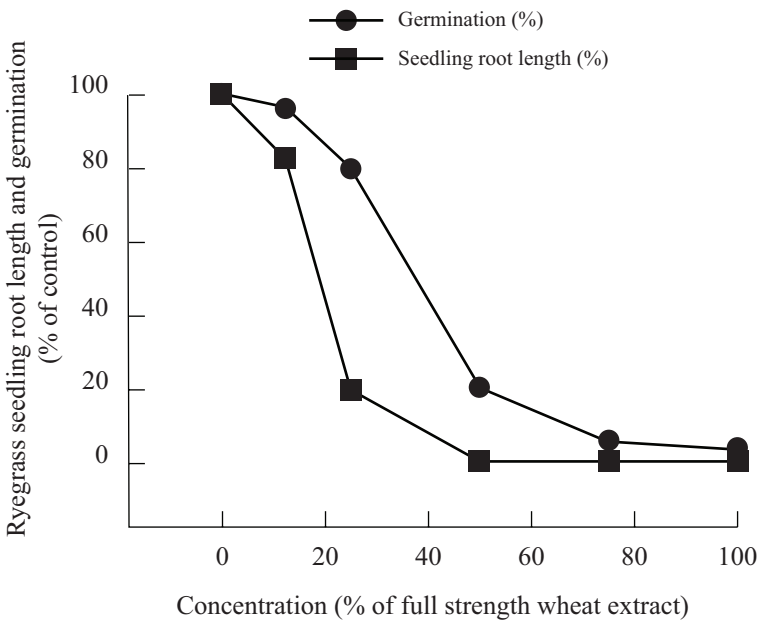
Australian scientists investigated one aspect of competition between wheat and ryegrass.

- Wheat plants were crushed up and mixed with distilled water.
- Water-soluble substances in the crushed plants dissolved in the water to make the full-strength extract.
- A series of dilutions of the full-strength extract were made.
- Ryegrass seeds were put into each dilution and the percentage that **germinated** (started growing) was recorded.
- If the seeds germinated, the **seedling root length** was also measured after 7 days.
- The results were presented as percentages of a control experiment.

For copyright reasons, this resource cannot be reproduced here.

Ryegrass in a wheat field.

http://www.arc.agric.za/uploads/images/5724_Fig%201.%20%20Ryegrass%20in%20a%20wheat%20field.jpeg



Adapted from: www.regional.org.au/au/asa/1998/6/139wu-1.gif

The graph shows the effects of different concentrations of wheat extract on the germination of ryegrass seeds and on the length of the roots of the seedlings that grew from them.

Discuss the outcome of this experiment and what it suggests about wheat and its response to its environment.

In your answer you should refer to the graph and:

- describe the interaction between wheat and ryegrass and its importance to wheat farmers
- compare the ryegrass seedling root length and germination, with the concentration of wheat extract
- fully explain the response between wheat and ryegrass that the results of this experiment suggest
- analyse the results to suggest how this response could provide an adaptive advantage to growing wheat plants.

MĀ TE KAIMĀKA ANAKE

He wāhi anō mō tō whakautu i tēnei pātai kei ngā whārangi 12 me 13.

There is more space for your answer to this question on pages 12 and 13.

MĀ TE KAIMĀKA ANAKE

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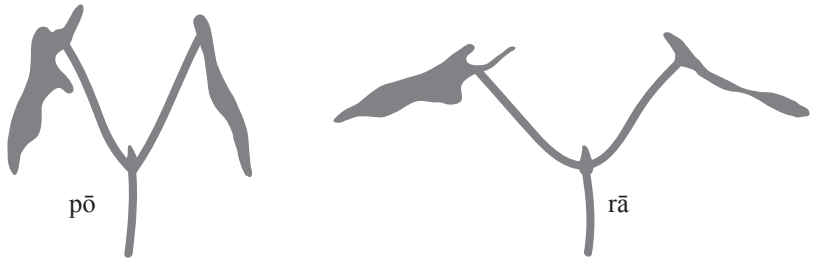
MĀ TE KAIMĀKA ANAKE

PĀTAI TUATORU: 'NEKEHANGA MOE'

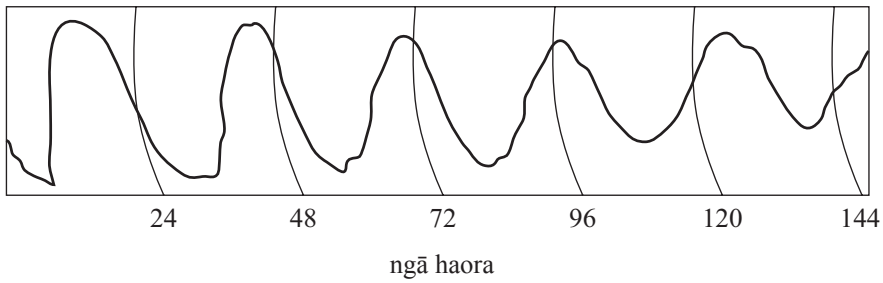
Ka whakaatu ētahi tipu i ngā rerekētanga auau i ngā nekehanga i roto i te wā. Tērā pea ko ngā 'nekehanga moe' ko te pōkai o ngā rau i te pō, pērā i ngā kanopī maha, pēnei i ngā pīni, te katinga rānei o ngā putiputi i ngā pō, pēnei i ngā tiurepa.

E whakaatu ana ngā hoahoa i raro i te tauira o te pōkai rau i roto i tētahi pīni whītau (*Phaseolus coccineus)*.

A



B



He mea urutau mai i: www.plantcell.org/content/18/4/792/F2.medium.gif

I te hoahoa **A**, e whakaaturia ana te pūwāhi o ngā rau matua o tētahi wana i te pō ki te taha mauī, ā, kei te taha matau i te awatea.

I te hoahoa **B**, e tohu ana ngā tihi o te ānau i te pūwāhi o te rau i te pō. E tohu ana ngā rārangi poutū i ngā wā 24 haora. Ko te wā mō tēnei takitaki haere he tata ki te 27 haora, ā, he mea hopu i te wā e noho ana te tipu i ngā āhuatanga awatea aumou.

Matapakihia te tauira o tēnei whanonga me te urupare taketake e puta ai tēnei tauira, ā, ka aromātai i te painga urutau ka tukuna e tēnei whanonga ki ētahi tipu me ōna putiputi.

I tō whakautu me:

- whakaahua te momo urupare e whakaaturia ana e te pīni whītau me te pūtake (**kāore** e hiahiatia ana tētahi whaiaroaro āmiki, hanganga hoki)
- whakamārama te take he pūngaroto te ūngeri, te tauira rānei o te pīni whītau, ā, kei te ahatia te ūngeri i roto i te wā
- aromātai ngā painga urutau e tukuna ana e tēnei tauira whanonga ki ētahi tipu me ōna putiputi, pēnei i te pīni whītau.

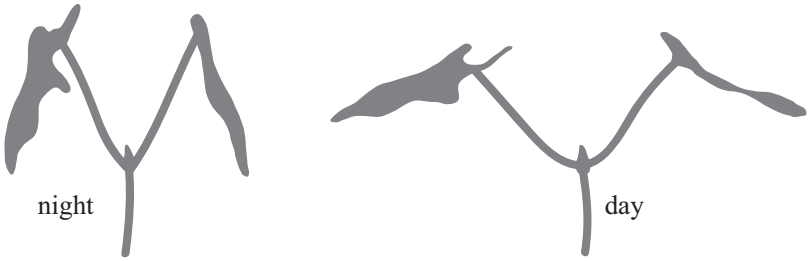
ASSESSOR'S USE ONLY

QUESTION THREE: 'SLEEP MOVEMENTS'

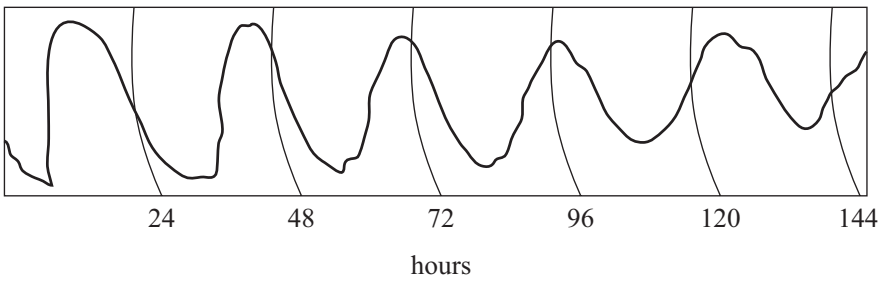
Some plants show regular changes in movement over time. 'Sleep movements' may involve the nightly folding of leaves, as in the case of many legumes, such as beans, or the nightly closing of flowers, such as tulips.

The diagrams below show the pattern of leaf folding in a runner bean (*Phaseolus coccineus)*.

A



B



Adapted from: www.plantcell.org/content/18/4/792/F2.medium.gif

In diagram **A**, the position of the primary leaves of a seedling at night is shown at the left, and during the day is shown at the right.

In diagram **B**, the peaks of the curve represent the night-time leaf position. The vertical lines indicate 24-hour intervals. The period for this trace is about 27 hours, and was recorded whilst the plant was kept in constant light conditions.

Discuss both the pattern of this behaviour and the underlying response that causes it, and evaluate the adaptive advantage this behaviour provides some plants and their flowers.

In your answer you should:

- describe the type of response shown by the runner bean and what causes it (detailed physiology and structure **not** required)
- explain why the rhythm or pattern shown by the runner bean would be endogenous and what is happening to the rhythm over time
- evaluate the adaptive advantages this pattern of behaviour provides some plants and their flowers with, such as the runner bean.

MĀ TE KAIMĀKA ANAKE

He wāhi anō mō tō whakautu i tēnei pātai kei ngā whārangi 18 me 19.

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There is more space for your answer to this question on pages 18 and 19.

MĀ TE KAIMĀKA ANAKE

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He puka anō mēnā ka hiahiatia.
Tuhia te (ngā) tāu pātai mēnā e hāngai ana.

TAU PĀTAI

MĀ TE KAIMĀKA ANAKE

Extra paper if required.
Write the question number(s) if applicable.

QUESTION NUMBER

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English translation of the wording on the front cover

Level 3 Biology, 2014

91603 Demonstrate understanding of the responses of plants and animals to their external environment

9.30 am Thursday 13 November 2014
Credits: Five

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of the responses of plants and animals to their external environment.	Demonstrate in-depth understanding of the responses of plants and animals to their external environment.	Demonstrate comprehensive understanding of the responses of plants and animals to their external environment.

91603M

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 attempt 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 2–21 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.

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