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91603M



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

SUPERVISOR'S USE ONLY

Koiora, Kaupae 3, 2015

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

2.00 i te ahiahi Rāhina 23 Whiringa-ā-rangi 2015
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 mēnā e rite ana te Tau Ākongā ā-Motu (NSN) kei runga i tō puka whakauru ki te tau kei runga i tēnei whārangi.

Me whakamātau koe i ngā tūmahi KATOĀ kei roto i tēnei pukapuka.

Mēnā ka hiahia whārangi atu anō mō ō tuinga, whakamahia ngā whārangi wātea kei muri o tēnei pukapuka, ka āta tohu ai i ngā tau tūmahi.

Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 2–17 kei roto i tēnei pukapuka, ā, kāore tētahi o aua whārangi i te takoto kau.

ME HOATU RAWA KOE I TĒNEI PUKAPUKA KI TE KAIWHAKAHAERE Ā TE MUTUNGA O TE WHAKAMĀTAUTAU.

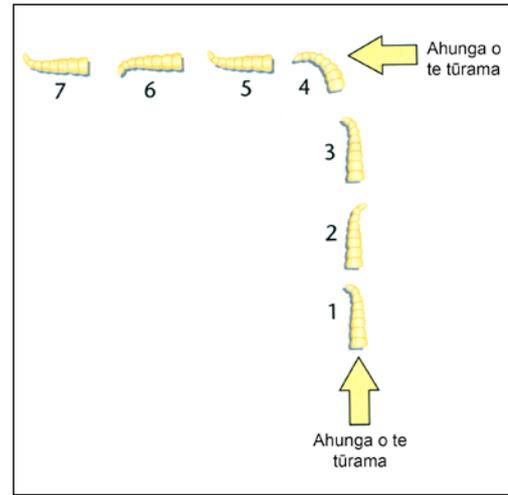
TAPEKE

MĀ TE KAIMĀKA ANAKE

TŪMAHI TUATAHI

Ka puta i ētahi kararehe ngā whanonga i ahu mai nō te whānautanga mai.

Ina ngōki ana ngā iro pātara kākāriki (*Phaenicia sericata*), ka huri ō rātau māhunga, ka whakataurite i te kaha tūrama¹ mai i ia taha. Ka huri ki te taha pōuri ake i ngā wā katoa, ka whakatawhiti atu i te tūrama.



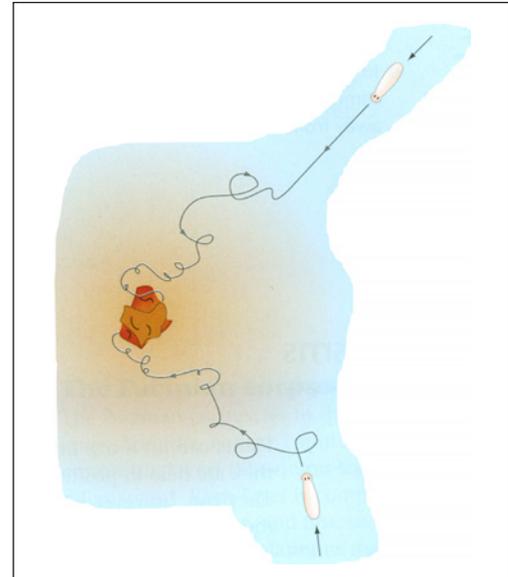
Urupare a te iro ki te whakaaraara tūrama.

Ka puta he rōnaki matū i tētahi mīti paku i roto i te wai. Ka neke haere ngā nokepapatahi, pēnei i te *Planaria torva*, ki tētahi ara tōtika kia kitea rā anō he pikitanga o te kukūtanga matū. Ka whakapikihia e ngā nokepapatahi tā rātau pāpātanga hurihuri ki te wāhi kia pā rā anō ki te mīti kātahi ka tīmata ki te kai.

Whakatauritehia ēnei urupare, ngā painga urutau e whiwhi ana mō ngā kararehe e whakaputa ana i ēnei, ā, i pēhea te whiwhi a ngā kararehe i ēnei.

I tō tuhinga, me:

- tautohu ngā kīanga whānui mō ngā urupare e rua, me te tautuhi i ēnei kīanga
- whakamahi ngā kōrero i runga hei parahau i ngā momo whakaangatanga i whakaahuahia e koe, ā, ka whakamārama hoki he pēhea te mahi a ēnei i roto i ngā iro me ngā nokepapatahi
- whakataurite ngā painga urutau ka whiwhi ēnei kararehe mā te whakaatu i ēnei whanonga.



Urupare a te nokepapatahi ki te whakaaraara matū.

He wāhi anō mō tō tuhinga mō tēnei tūmahi kei te whārangi 4 kei te whārangi 5.

¹ aho

TŪMAHI TUARUA

He kūrae hōrakerake Te Kauae-o-Māui kei te taha moana o Te Matau-a-Māui, ā, koinei te nōhanga o te pūrei tatakī nui rawa (*Morus serrator*) i Aotearoa, ā, tata ki te 6500 ngā takirua whakaputa uri e taetae mai ana i te tīmatanga o te marama o Hereturikōkā o ia tau. Ka noho ngā manu kia pakari rā anō ngā pīpī ki te wehe, ā, ka hoki atu ki Ahitereiria i te Poutūterangi o te tau o muri mai.

Ko te tikanga kotahi te hoa o ngā tatakī i roto i ngā wā whakaputa uri maha, ā, ka hono anō rāua i te tīmatanga o ia wā whakaputa uri. I te wā whakaputa uri, pau katoa te whenua i te mahi a te tatakī me te aha ka āta āraitia e rātou ō rātou kōhanga.

Ka whakawhānau ngā uwaha i te hua kahurangi-mā kotahi, he rite ki te hua nui a tētahi heihei, mai i waenganui o te Mahuru ki waenganui o te Hakihea. Ka whānau te hua ki te kōhanga i mahia mai i te rimurimu maroke, ka whakamārōhia ki te hamuti manu, ā, ka nōhia haerehia e ia kātua. I te ekenga o te rā 43, ka paopao mai tētahi pīpī kore huruhuru, kāpō hoki, ā, ka whāngaia, ka manaakitia hoki e ngā kātua e rua.



*I runga i ngā here manatārua,
kāore e whakaaetia te
whakaaturanga o tēnei
rauemi i konei.*

https://upload.wikimedia.org/wikipedia/commons/e/e9/Gannet_colony_cape_kidnappers.jpg

Aromātaitia ngā whanonga e puta ana i te tatakī, mā te whakamahi i ngā kōrero i runga ake.

I tō tuhinga, me:

- tautohu me te whakaahua ngā whanonga e TORU i whakaaturia e ngā tatakī
- whakamārama ngā mate me ngā painga o ngā whanonga i tautohua e koe
- matapaki he pēhea te tuku uara urutau a aua whanonga paheko ki ngā tatakī.

**He wāhi anō mō tō tuhinga mō
tēnei tūmahi kei te whārangi 10
kei te whārangi 11.**



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reproduced here.*

[https://upload.wikimedia.org/wikipedia/commons/e/e9/
Gannet_colony_cape_kidnappers.jpg](https://upload.wikimedia.org/wikipedia/commons/e/e9/Gannet_colony_cape_kidnappers.jpg)

**There is more space for your
answer to this question on
pages 10 and 11.**

QUESTION TWO

Cape Kidnappers on the coast of Hawke's Bay is an exposed headland, which hosts the largest mainland gannet (*Morus serrator*) colony in New Zealand, with around 6500 breeding pairs arriving in early August each year. The birds remain until the young fledglings are mature enough to leave, and then return to Australia in March the following year.

Gannets usually have the same mate over many breeding seasons and re-establish their relationship at the beginning of each breeding season. During the breeding season, the area is densely occupied by the gannets which actively defend their nesting sites.

Females lay a single pale blue egg, the size of a large hen's egg, any time from mid-September till mid-December. It is laid in a nest prepared from dried seaweed, cemented with guano (bird droppings), and incubated by each parent in turn. After 43 days, a blind, naked chick hatches, and is fed and cared for by both parents.

Evaluate the behaviours the gannet displays, using the given information above.

In your answer:

- identify and describe THREE behaviours displayed by the gannets
- explain the costs and benefits of the behaviours you have identified
- discuss how the combination of behaviours provides adaptive value to the gannets.

TŪMAHI TUATORU

Kei reira ngā whanaungatanga tētahi ki tētahi i waenga i ngā manu taketake² o Aotearoa, engari ka whakaawe pea ngā konihi whāngote o tāwāhi i tēnei.

He ngahere tino nui a Maungatautari i roto o Waikato, kua whakawāteatia katoa ngā konihi whāngote, ā, kua whakatūhia he taiepa i tōna pae kia kore ai e uru mai he konihi. Kua whakamahia te wāhi nei hei mātai i te pānga o te whakawāteatanga o ngā konihi ki te kaha o ngā manu ki te whakahaehae i ngā momo tipu taketake.

I whakamahia te kōtukutuku – *Fuchsia excorticata*, hei momo tūtohu, ā, i whakatauritehia ki te Ngahere o Pirongia e pātata mai ana, he wāhi tēnei e nōhia ana e ngā konihi whāngote.

Kei ngā rākau *Fuchsia excorticata* tētahi o ngā momo putiputi e rua:

- ngā putiputi uwaha e hiahia ruingahae ana
- ngā putiputi ira rua (toa me te uwaha), ka taea e rātou anō te ruingahae.

Nā ngā otinga ruingahae momoho ka puta ngā hua.

Kua whakarāpopototia i raro nei ētahi otinga mai i te mātai.

Te pāpātanga o te taetae atu o ngā manu
whakahaehae ki ngā pua *Fuchsia excorticata*

Ngā tatau hae a ngā uwaha me ngā pua ira
rua o te *Fuchsia excorticata*

*I runga i ngā here manatārua,
kāore e whakaaetia te
whakaaturanga o tēnei
rauemi i konei.*

(Ngā hēkona toharite o ngā mahinga manu mō ia pua
100 i te hāora)

He meaurutau mai i Iles J.M. rāua ko Kelly D. School of
Biological Sciences, Waitaha. I whakaputaina tuihonotia i te
9 Paengawhāwhā 2014.

E tohu ana tētahi taupū tatau hae o te 1.5 (raina
pīhonohono) i te tatau whakahaehae pai, e ai ki te
whanaungatanga i waenga i te kawenga hae me te
hanganga o ngā hua.

He meaurutau mai i Iles J.M. rāua ko Kelly D. School of
Biological Sciences, Waitaha. I whakaputaina tuihonotia i
te 9 Paengawhāwhā 2014.

² māori

There is more space for your answer to this question on page 15.

QUESTION THREE

Mutualistic relationships exist between New Zealand's native birds and trees, but introduced mammalian predators can affect this.

Maungatautari in the Waikato is a large area of forest where mammalian predators have been eradicated and a perimeter fence has been built to keep it predator free. The area has been used to study the effect of predator removal on the ability of birds to successfully pollinate species of native plants.

The New Zealand fuchsia, (kōtukutuku) – *Fuchsia excorticata*, was used as an indicator species, and comparisons were made with nearby Pirongia Forest Park, where mammalian predators are present.

Fuchsia excorticata trees have one of two flower types:

- female flowers which need pollination
- hermaphrodites (male and female) which can self-pollinate.

Successful pollination results in formation of fruit.

Some results from the study are summarised below.

Visitation rates of pollinating birds to
Fuchsia excorticata flowers

Pollen scores of female and hermaphrodite
Fuchsia excorticata

(Mean seconds of bird activity per 100 flowers per hour)

Adapted from Iles J.M. & Kelly D. School of Biological Sciences, Canterbury. Published online 9 April 2014.

A pollen score index of at least 1.5 (dashed line) indicates a good pollination score, based on the relationship between pollen load and formation of fruit.

Adapted from Iles J.M. & Kelly D. School of Biological Sciences, Canterbury. Published online 9 April 2014.

Discuss the ecological relationships between the fuchsia trees, the bird species, and the presence or lack of mammals within the two forests, using the information given above to support your discussion.

In your answer:

- define the terms mutualism, predation, and interspecific competition
- explain the importance of pollination for both the fuchsia and the native birds
- use the data to compare, with reasons, the outcomes for *Fuchsia excorticata* and the key native bird species involved at the two sites.

English translation of the wording on the front cover

Level 3 Biology, 2015

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

2.00 p.m. Monday 23 November 2015
Credits: Five

91603M

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.

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 room for any answer, use the extra space provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–17 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.