

3

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, 2017

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

9.30 i te ata Rāpare 16 Whiringa-ā-rangi 2017
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 Ākonga ā-Motu (NSN) kei runga i tō puka whakauru ki te tau kei runga i tēnei whārangi.

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

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

Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 2–15 kei roto i tēnei pukapuka, ā, kāore tētahi o aua whārangi i te takoto kau.

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

TAPEKE

MĀ TE KAIMĀKA ANAKE

TŪMAHI TUATAHI



Ngā kākano māmuka.
www.amazon.co.uk/Manuka-tree-leptospermum-scoparium-seeds/dp/B01BP3WCGA

Ngā kākano māmuka e tinaku ana.
<http://slideplayer.com/slide/5661375/>

Ngā wana māmuka i te rua marama.
<http://www.treeproject.org.au/seedling-database/leptospermum-scoparium>

I te wā ka tinaku te kākano o te māmuka (*Leptospermum scoparium*) i raro i te mata oneone, e rua ngā urupare tipu rerekē ka pā ki te paiaka me te pihi.

Ka tuku ngā rākau māmuka pakari i tētahi matū patu tarutaru māori (leptospermone).

Matapakitia te whai hua o ngā urupare rerekē e whakaaturia ana e te tipu māmuka i te tinakutanga me te tipu tōmua ki te oranga o te tipu.

I tō tuhinga, me:

- tautohu me te whakaahua i ngā urupare rerekē e rua e whakaaturia ana e ngā wana māmuka ina tinaku ana ki roto i te oneone
- whakamārama i te momo tauwhitiwhiti i waenga i te māmuka pakari me ētahi atu tipu e tipu tūtata mai, nā te tukutanga o te leptospermone ki te oneone
- whakamārama he pēhea te pā mai o ēnei urupare ki roto i te oneone i te tinakutanga o te māmuka
- matapaki i te painga urutau o ēnei urupare e rua ki roto i te oneone, me te whakataurite ki te urupare ina puta te pihi ki roto i te tūranga.

Ka taea e koe ngā hoahoa tautuhi te whakamahi i roto i tō whakautu.

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

QUESTION ONE

ASSESSOR'S
USE ONLY



Mānuka seeds.
www.amazon.co.uk/Manuka-tree-leptospermum-scoparium-seeds/dp/B01BP3WCGA

Mānuka seeds germinating.
<http://slideplayer.com/slide/5661375/>

Mānuka seedlings after 2 months.
<http://www.treeproject.org.au/seedling-database/leptospermum-scoparium>

When the mānuka (*Leptospermum scoparium*) seed germinates below the soil surface, two different plant responses occur at the radical and plumule.

Mature mānuka trees release leptospermone, a chemical that acts as a natural herbicide.

Discuss how the different responses that the mānuka plant displays in germination and early growth are beneficial to the survival of the plant.

In your answer:

- identify and describe the two different responses shown by the mānuka seedling as it germinates below the soil
- explain the type of interaction between the mature mānuka and other plants growing nearby, due to the release of leptospermone into the soil
- explain how these responses occur below the soil as the mānuka germinates
- discuss the adaptive advantage of these two responses below the soil, and compare them with the response once the plumule is exposed to light.

You may use annotated diagrams as a part of your answer.

There is more space for your answer to this question on pages 4 and 5.

TŪMAHI TUARUA

<http://www.nzbirdsonline.org.nz/species/sooty-shearwater>

http://www.teara.govt.nz/files/5484-enz_0.jpg

Ka wehe te tītī (*Puffinus griseus*) i Aotearoa i te takurua o Te Tuakoi Tonga - he raumati i te Tuakoi Raki - ka whai i ngā hau pūmau i ngā wāhi rerekē o te ara hekenga.

Ina tuhia ki tētahi mahere whenua, he rite ngā ara ki ngā tohutu waru nunui rawa i runga ake o Te Moananui-a-Kiwa (tirohia te mahere whenua i runga ake).

He kaiheke mamao whakaharaha ēnei, e rere whakateraki ana mā ngā taha uru o Te Moananui-a-Kiwa me te Moana Ranatiki i te mutunga o te wā whakawhānau hua i te Poutūterangi-Haratua, ka tae ki ngā wai i te taha tonga o Te Kōpaka Raro i te Pipiri-Hōngongoi, i reira ka whakawhiti atu mai i te uru ki te rāwhiti, kātahi ka hoki haere mai ki te tai tonga mā ngā taha rāwhiti o ngā moana i te Mahuru-Whiringa-ā-nuku, ka tae ki ngā pūrei whakaputa uri i te Whiringa-ā-rangi. Kāore e rere kāhui ana, engari ka rere takitahi, he tūpono noa te tūhonohono haere.

E whakaatu ana ngā whakamātau tūtohu whaiwhai ko ngā manu e whakaputa uri ana i Aotearoa he 74 000 km te rere i te tau, ka tae ki Hapanihi, Arahaka, me Karipōnia, he 500 km te tawhiti toharite i te rā.

Matapakitia he aha i hira ai te hekenga ki te hauora me te orangatonutanga o te tītī.

I tō tuhinga, me:

- whakaahua i te hekenga
- whakamārama mai he pēhea te whakarite a te tītī i te wā hekenga, Ā, he pēhea te whakaterere i te wā o te hekenga
- matapaki i ngā mate me ngā painga o te hekenga mō te tītī.

**He wāhi anō mō tō tuhinga
mō tēnei tūmahi kei ngā
whārangi 8 me 9.**

QUESTION TWO

<http://www.nzbirdsonline.org.nz/species/sooty-shearwater>

http://www.teara.govt.nz/files/5484-enz_0.jpg

The sooty shearwater or mutton bird (*Puffinus griseus*) leaves New Zealand in the Southern Hemisphere's winter – summer in the Northern Hemisphere – and takes advantage of prevailing winds along different portions of their migration route.

When plotted on a map, their paths look like giant figure eights over the Pacific Ocean (see map above).

They are spectacular long-distance migrants, travelling north up the western sides of the Pacific and Atlantic Oceans at the end of the nesting season in March–May, reaching subarctic waters in June–July, where they cross from west to east, then returning south down the eastern sides of the oceans in September–October, reaching the breeding colonies in November. They do not migrate as a flock, but rather as single individuals, associating only opportunistically.

Recent tagging experiments have shown that birds breeding in New Zealand may travel 74 000 km in a year, reaching Japan, Alaska, and California, averaging more than 500 km per day.

Discuss why migration is important to the health and survival of the sooty shearwater.

In your answer:

- describe migration
- explain how the sooty shearwater might determine the time for migration, AND how they may navigate during migration
- discuss the costs and benefits of migration to the sooty shearwater.

There is more space for your answer to this question on pages 8 and 9.

TŪMAHI TUATORU



<http://howardcheek.photoshelter.com/image/I00005Pm3.HDRznl>

<http://cursa.ihmc.us/rid=1Q19NCQSR-1PH7VJX-2V1Q/flowering%20in%20plants.png>

He tipu rā-roa te mākuka (*Leptospermum scoparium*), ā, ka pua i te kōanga tae atu ki te raumati. Ka whakahaerehia te puāwai o te mākuka e te pūnaha kano ngoiaho (phytochrome). Ka whakamahia ngā pua e ngā kairaupi hei whakaputa miere mākuka. Ka rapua e ngā pi miere (*Apis mellifera*) he kai i roto i tētahi rohe paenga o te 3 ki te 4 km huri noa i te kōhanga pi. Ka whakatore ngā pi mai i te kōhanga pi ki ngā pua mā te whakamahi i ngā aratohu rerekē i roto i te rā.

Whakahāngaitia te mahi a te pūnaha kano ngoiaho ki te orangatonutanga o te taupori tipu mākuka.

I tō tuhinga, me:

- tautohu me te whakaahua i te pātahitanga o te rākau mākuka me ngā pi
- whakaahua i te tukanga o te urupare ki ngā roanga rā rerekē (photoperiodism) ME TE whakamārama ka pēhea te mahi a te pūnaha kano ngoiaho i roto i te rākau mākuka
- matapaki he pēhea te tuku a te urupare ki ngā roanga rā rerekē i roto i te rākau mākuka i tētahi painga urutau ki ngā momo e RUA.

Ka whakaaetia te whakamahi hoahoa tautuhi hei tautoko i tō tuhinga.

He wāhi anō mō tō tuhinga mō tēnei tūmahi kei ngā whārangi 12 me 13.

QUESTION THREE



<http://howardcheek.photoshelter.com/image/I00005Pm3.HDRznl>

<http://cursa.ihmc.us/rid=1Q19NCQSR-1PH7VJX-2V1Q/flowering%20in%20plants.png>

Mānuka (*Leptospermum scoparium*) are long-day plants which flower in spring and into summer. Flowering in the mānuka plant is controlled by the phytochrome system. The flowers are used by beekeepers to produce mānuka honey. Honeybees (*Apis mellifera*) seek their food within a circumference of 3 to 4 km around their hive. The bees navigate from the hive to the flowers using different cues during the day.

Relate the role of the phytochrome system to the survival of the mānuka plant population.

In your answer:

- identify and describe the relationship between the mānuka tree and the bees
- describe the process of photoperiodism AND explain how the phytochrome system could work in the mānuka tree
- discuss how photoperiodism in the mānuka tree provides an adaptive advantage to BOTH species.

You may use annotated diagrams to support your answer.

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

Lined writing area consisting of 28 horizontal lines.

Small empty square box at the bottom right of the page.

English translation of the wording on the front cover

Level 3 Biology, 2017

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

9.30 a.m. Thursday 16 November 2017
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 2–15 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.