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91603M



916035



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

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Tohua tēnei pouaka mēnā
KĀORE koe i tuhituhi i roto i
tēnei pukapuka

Koiora, Kaupae 3, 2021

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

Ngā 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 a-Motu kei tō pepa whakauru ki te tau kei runga ake nei.

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

Ki te hiahia koe ki ētahi atu wāhi hei tuhituhi whakautu, whakamahia te wāhi wātea kei muri i te pukapuka nei.

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

Kaua e tuhi ki roto i tētahi wāhi kauruku whakahāngai (X). Ka tapahia pea tēnei wāhi ina mākahia te pukapuka.

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

TŪMAHI TUATAHI: HE PUĀWAI MOEAO

Ko te pua ahiahi (evening primrose), *Oenothera biennis*, he tipu ka ora mō te rua tau. He maha ana **pua kōwhai ka huaki i te pō**, i ētahi wā rānei mai i te ahiahi rawa tae noa ki te waenganui ata. He **kaha te kakara**, ka mutu he pai i roto i ngā māra, kua mō te tae i te pō me te kakara noa iho, engari **kāore e tipu he tarutaru** i te taha o ēnei tipu.

Aromātaitia ngā whanonga urutau o te pua ahiahi.

I tō tuhinga, me:

- whakaingoa me te tautuhi:
 - i te tino urupare pea ka whakaaturia e te pua ahiahi mā te huaki i ngā pua i te pō, me
 - te hononga i waenga i te tipu me ngā tarutaru
- whakamārama i te tikanga tauwhāiti mō te āhua o te huaki i ngā pua i te pō
- matapaki he pēhea pea te whakarite a ngā whanonga kua **taekahatia** i runga ake ki te tipuranga me te whakaputa uri anō ina noho ana i tētahi wāhi he maha ngā momo puāwai.

Mātāpuna: <https://sweetfernandfireflies.blogspot.com/2017/08/evening-primrose-and-bumblebees-part-one.html>

*He wāhi anō mō tō tuhinga
mō tēnei tūmahi kei ngā
whārangi o muri mai.*

QUESTION ONE: NIGHT FLOWERS

Evening primrose, *Oenothera biennis*, is a plant that lives for two years. It has many small yellow **flowers that open at night** or, at times, also from late afternoon through to mid-morning. They have a **strong scent** and are useful in gardens, not only for their night colour and scent, but also because the presence of these plants in the soil **prevents weeds** growing near them.

Evaluate the adaptive behaviours of the evening primrose.

In your answer:

- name and define both of:
 - the likely response shown by the evening primrose opening its flowers at night, and
 - the relationship between the plant and the weeds
- explain the specific mechanism for how the nightly opening of the flowers occurs
- discuss how the behaviours in **bold** above may ensure both successful growth and reproduction when living in an area with many flower species.

Source: <https://sweetfernandfireflies.blogspot.com/2017/08/evening-primrose-and-bumblebees-part-one.html>

There is more space for
your answer to this question
on the following pages.

TŪMAHI TUARUA: TE WHANONGA A TE HĀKOAKOA

Ko te hākoakoa (*Catharacta antarctica lonnbergi*) he manu moana parauri e āhua rite ana ki tētahi wkaroro nui.

He whakaaturanga hākoakoa.

Mātāpuna: www.nzbirdsonline.org.nz/species/subantarctic-skua

He hākoakoa e whakaatu ana i te whanonga whakarikiriki ki tētahi kororā.

Mātāpuna: <https://news.cgtn.com/news/2019-12-02/Ice-and-fury-penguins-vs-skuas-M5EhW0Ro5O/index.html>

He hākoakoa me tētahi karoro e rere ana.

Mātāpuna: www.luontoportti.com/suomi/fi/linnut/merilokki

Me kī he mārire ina rere ana, i te moana hoki, he tino kaha te whakaatu i tana takiwā, arā he hiki i ngā parihau me tētahi tangi roa e heke ana. Hamuhamu kai ai te hākoakoa, he tāhae i ngā kai a ētahi atu manu i te wā e rere ana i te takiwā, me te konihi. Ko te tautiaki a ngā hākoakoa i ngā takiwā kai he whakaatu he kai i ngā hua me ngā pīpī kororā. Ko ngā takirua hākoakoa e pupuri ana i ngā takiwā kai i roto i ngā kōhanga kororā ka whakangungu i ēnei wāhi mai i ngā mea kōkuhu mēnā kei raro iho i te 3 m te rere i runga ake. Ka rerekē haere te nui o te takiwā i tēnā tau, i tēnā tau. He tino nui ake te kaha e whakapaua ana e ngā hākoakoa toa ina aruaru kai me te whakangungu takiwā tēnā i ngā uwaha.

Matapakitia he aha i angitu ai te hākoakoa nā ngā whanonga takiwā taketake.

I tō tuhinga, me:

- tautuhi tēnei mea te 'takiwā'
- whakamārama i pēhea te angitu o ngā pīpī hākoakoa nā ngā whanonga takiwā
- matapaki he aha ngā āhuatanga e rerekē ai te nui o te takiwā mai i tēnā tau, i tēnā tau, ā, he pēhea e angitu ake ai te momo hākoakoa i tēnei.

He wāhi anō mō tō tuhinga
mō tēnei tūmahi kei ngā
whārangi o muri mai.

QUESTION TWO: SKUA BEHAVIOUR

The hākoako or New Zealand subantarctic skua (*Catharacta antarctica lonnbergi*) is a dark-brown seabird resembling a large gull.

A skua display.

Source: www.nzbirdsonline.org.nz/species/subantarctic-skua

A skua showing aggressive behaviour to a penguin.

Source: <https://news.cgtn.com/news/2019-12-02/Ice-and-fury-penguins-vs-skuas-M5EhWORo5O/index.html>

A skua and a gull in flight.

Source: www.luontoportti.com/suomi/fi/linnut/merilokki

Usually quiet in flight and at sea, skuas have a loud territorial display, which includes the raising of wings and a descending long call. Skuas are opportunistic feeders that obtain food through scavenging, stealing from other birds while in the air, and predation. The maintenance of feeding territories by skuas shows that they feed on penguin eggs and chicks. Skua pairs that hold feeding territories in a penguin rookery defend these areas against intruders if they fly less than 3 m above them. Territory size changes year to year. The energy investment of male skuas in hunting and territorial defence is a lot greater than for the female.

Discuss how innate territorial behaviours have led to the success of skuas.

In your answer:

- define 'territory'
- explain how territorial behaviour leads to the success of the skua chicks
- discuss what factors bring a change in territory size from year to year, and how this enables more success for the skua species.

There is more space for your answer to this question on the following pages.

Lined area for writing or drawing, consisting of horizontal lines.

TŪMAHI TUATORU: NGĀ WAI O HĀMOA

He noke noho moana te paroro (*Eunice viridis*) e noho ana i ngā pūkawa roke kanae¹ pāpaku puta noa i te pū o Te Moananui-a-Kiwa. Noho ai ngā paroro i ngā rua kua karia ki te roke kanae kei ngā pūkawa papatahi o waho. E rua ngā wāhanga rerekē (tirohia te tātuhinga). Ko te wāhanga o mua ko te tinana noke, me ngā karu, waha, aha atu, aha atu, whai muri mai ko ngā wāhanga e kīa ana ko te 'epitoke' kei roto ko ngā pūtau tohuhema whakaputa uri he kikorangi-kākāriki (uwaha), he pākākā (toa) rānei. He wāhi karu iti rawa tō ia wāhanga epitoke e rongo ai i te mārāma. Pā mai ai te toene mō ngā pō e rua, e toru rānei, ka tīmata atu i te whitu rā i muri mai i te rākaunui o te Whiringa-a-nuku, Whiringa-a-rangi rānei o ia tau. I te pō, ka puta whakamuri mai ngā noke paroro i ngā rua ka tuku i ngā wāhanga epitoke mai i te tinana, kātahi ka rewa ake ēnei ki runga o te wai. I te atatū, ka whakarewa ngā wāhanga me te whakaputa i ngā hua me ngā waitātea kei roto. I Hāmoa, he horotai ngā wāhanga epitoke (paroro) e mānu ana, ka kohia i te pō mā ngā rama.

www.abc.net.au/news/2020-10-11/palolo-season-in-samoa-where-locals-hunt-for-an-ocean-delicacy/12740588

www.nps.gov/npsa/learn/nature/upload/2nded05c.pdf

Matapakitia ngā tauira koiora me ngā rautaki e angitu ai te noke paroro.

I tō tuhinga, me:

- whakaingoa me te tautuhi i ngā tauira koiora e rua kua whakaahuatia i runga ake mō te noke paroro
- whakamārama mai i tētahi pūtake e kohikohi ai te iwi kāinga i te paroro i te pō mā ngā rama
- whakamārama mai i tētahi rautaki whakaputa uri e whakamahia ana e ngā noke paroro, ā, me te whakamārama i tētahi raru o taua rautaki whakaputa uri
- matapaki he pēhea te angitu o te momo nā te haere ngātahi o ngā tauira koiora.

He wāhi anō mō tō tuhinga
mō tēnei tūmahi kei ngā
whārangi o muri mai.

¹ wheo, kāoa

QUESTION THREE: SAMOAN WATERS

The palolo worm is a marine worm (*Eunice viridis*) that lives in shallow coral reefs throughout the south central Pacific. They live in burrows dug into the coral on the outer reef flat. They have two distinct sections (see drawing). The front section is the worm body, with eyes, mouth, etc., followed by a string of segments called the 'epitoke' that contain reproductive gametes coloured blue-green (females) or tan (males). Each epitoke segment has a tiny eyespot that can sense light. Spawning takes place for two or three nights, beginning seven days after the full moon in October or November each year. Late in the evening, the palolo worms back out of their burrows and release the epitoke sections from their body, which then floats to the surface. Around daybreak, the segments dissolve and release the eggs and sperm that they contain. In Samoa, the floating epitoke segments are regarded as a delicacy (palolo), and are gathered at night using lanterns.



www.abc.net.au/news/2020-10-11/palolo-season-in-samoa-where-locals-hunt-for-an-ocean-delicacy/12740588

www.nps.gov/npsa/learn/nature/upload/2nded05c.pdf

Discuss biological rhythms and strategies that lead to success in the palolo worm.

In your answer:

- name and define two of the biological rhythms described above for the palolo worm
- explain a reason why locals would choose to gather palolo at night with lanterns
- explain a reproductive strategy used by the palolo worms, and also explain a disadvantage of that reproductive strategy
- discuss how the synchronised rhythms together lead to the success of the species.

There is more space for your answer to this question on the following pages.

**He whārangi anō ki te hiahiatia.
Tuhia te (ngā) tau tūmahi mēnā e tika ana.**

TAU TŪMAHI

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

QUESTION
NUMBER

English translation of the wording on the front cover

Level 3 Biology 2021

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

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.

Check that this booklet has pages 2–15 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (▨). This area may be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.