

91156M



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

2

SUPERVISOR'S USE ONLY

Koiora, Kaupae 2, 2015

91156M Te whakaatu māramatanga ki ngā tukanga ora e pā ana ki te pūtau

9.30 i te ata Rāhina 16 Whiringa-ā-rangi 2015
Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki ngā tukanga ora e pā ana ki te pūtau.	Te whakaatu māramatanga hōhonu ki ngā tukanga ora e pā ana ki te pūtau.	Te whakaatu māramatanga matawhānui ki ngā tukanga ora e pā ana ki te pūtau.

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 2–21 kei roto i tēnei pukapuka, ka mutu, 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: TE TUKUPŪNGAO ME NGĀ PŪMUA WHĀKŌKĪ

(a) Whakaahuatia te whāinga o te tukupūngao ā-pūtau, Ā, kei hea i roto i te pūtau.

(b) Ko te nōhanga o te tio Amerikana (*Crassostrea virginica*) ko te ākau toka, ā, he nui ngā rerekētanga o te pāmahana o te taiao me te kukūtanga hāora. Kei roto anō i tēnei wāhi noho ko ngā konganuku taumaha pea, pēnei i te konupakē (cadmium).

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

Tio Amerikana (*Crassostrea virginica*)

<http://www.bily.com/pnwsc/web-content/Family%20Pages/Bivalves%20-%20Ostreidae,%20Anomiidae.html>

Ko te tukupūngao ā-pūtau o te tio Amerikana me te mahinga pūmua whākōkī ka pāngia e te pāmahana taiao, te kukūtanga hāora, me te konupakē.

Matapakitia he pēhea te pānga o te pāmahana, te kukūtanga hāora, me te konupakē ki te tukupūngao ā-pūtau ME te mahinga pūmua whākōkī i roto i te tio Amerikana.

I tō tuhinga:

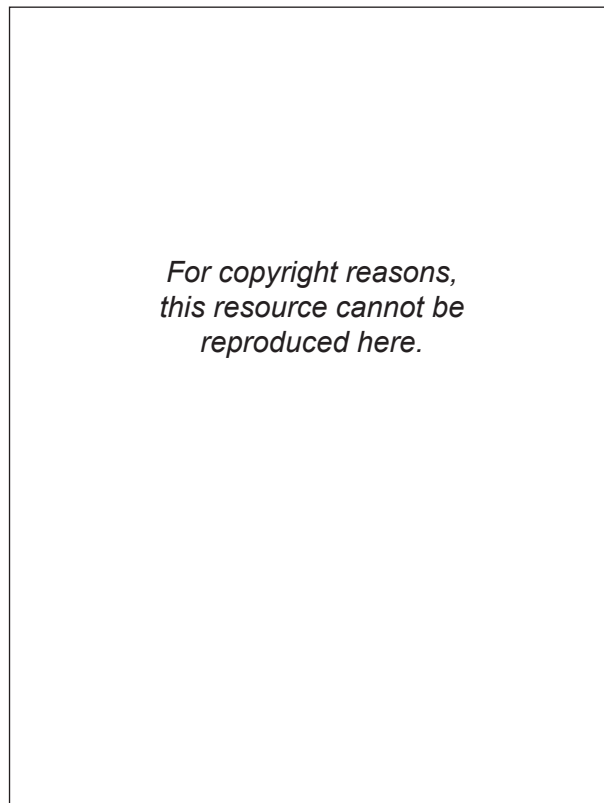
- whakaahuatia te whāinga o te pūmua whākōkī
- whakamāramahia he pēhea te whakaawe a te pāmahana me te konupakē i ngā mahi a ngā pūmua whākōkī
- matapakitia he pēhea te pānga o te pāmahana taiao, te kukūtanga hāora, me te konupakē ki te pāpātanga o te tukupūngao ā-pūtau i roto i te tio Amerikana.

Ka whakaaetia te whakamahi hoahoa i roto i tō tuhinga.

QUESTION ONE: RESPIRATION AND ENZYMES

- (a) Describe the purpose of cellular respiration, AND where it occurs in the cell.

- (b) The eastern oyster's (*Crassostrea virginica*) habitat is the rocky shore, which experiences large changes in environmental temperature and oxygen concentration. This habitat can also contain heavy metals, such as cadmium.



Eastern oyster (*Crassostrea virginica*)

<http://www.bily.com/pnwsc/web-content/Family%20Pages/Bivalves%20-%20Ostreidae,%20Anomiidae.html>

The eastern oyster's cellular respiration and enzyme activity are affected by environmental temperature, oxygen concentration, and cadmium.

Discuss how temperature, oxygen concentration, and cadmium can affect cellular respiration AND enzyme activity in the eastern oyster.

In your answer:

- describe the purpose of an enzyme
- explain how temperature and cadmium affect enzyme activity
- discuss how environmental temperature, oxygen concentration, and cadmium can affect the rate of cellular respiration in the eastern oyster.

You may use diagrams in your answer.

Lined writing area with horizontal lines.

TŪMAHI TUARUA: NEKEHANGA O NGĀ MATŪ

E noho ana te noke ‘lugworm’ (*Arenicola marine*) ki ngā takutai kirikiri e āhua hurihuri ai te kukūtanga o te wai tai. Kia ora ai i tēnei nōhonga, ka **whakarite noa** te lugworm i te kukūtanga o te wai tai o tōna tinana kia rite ai ki te wai tai o te takiwā. Ka pūmau te whakapeto hāora i te wā o tēnei tukanga.

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

<http://marinebio.org/species.asp?id=57>

Noho ai te pātiki ‘hogchoker’ (*Trinectes maculates*) i ngā wahapū, e ōrite ai te huri o te kukūtanga wai tai. Ēngari ka **mātātoa** te hogchoker ki te whakarite i te kukūtanga wai tai o tōna tinana i a ia i roto i te wai he nui te kukūtanga kurutai. I te pikitanga o te kukūtanga kurutai, ka piki anō te whakapeto hāora.

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

http://www.okeefes.org/Photo_Journal/Summer_2013/Summer_2013.htm

Matapakitia te nekehanga o ngā matū i roto i ngā pūtau o te lugworm me te hogchoker, ā, me te pānga o te whakapeto hāora ki ēnei tukanga.

I tō tuhinga:

- whakaahuahia te ingotanga, te rerewai, me te whakawhiti hohe
- whakamāramahia he pēhea te neke o te wai tai i te kiriuhi pūtau i roto i te lugworm mā te rerewai me te ingotanga whakahaere
- whakamāramahia he pēhea te neke o te wai tai i te kiriuhi pūtau i roto i tētahi hogchoker mā te rerewai me te whakawhiti hohe
- matapakitia te take ka noho pūmau te whakapeto hāora i roto i te lugworm, ā, ka piki kē te whakapeto hāora i roto i te hogchoker i te pikitanga o te kukūtanga wai tai, me te tūhono i tēnei ki te tukanga ora o te tukupūngao ā-pūtau.

Ka whakaaetia te whakamahi hoahoa i roto i tō tuhinga.

**He wāhi anō mō tō tuhinga mō
tēnei tūmahi kei te whārangi 12.**

QUESTION TWO: MOVEMENT OF MATERIALS

The lugworm (*Arenicola marine*) lives on sandy shores where the salt water concentration can fluctuate slightly. To survive in this habitat, the lugworm **passively** adjusts the salt water concentration of its body to match the surrounding seawater. Oxygen consumption remains constant during this process.

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reproduced here.*

<http://marinebio.org/species.asp?id=57>

The hogchoker (*Trinectes maculates*) lives in estuaries, where salt water concentration changes regularly. However, the hogchoker **actively** adjusts the salt water concentration of its body when in high salt concentration water. As salt concentration increases, oxygen consumption also increases.

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http://www.okeefes.org/Photo_Journal/Summer_2013/Summer_2013.htm

Discuss the movement of materials in the lugworm and hogchoker cells, and how oxygen consumption affects these processes.

In your answer:

- describe diffusion, osmosis, and active transport
- explain how salt water moves across the cell membrane in a lugworm via osmosis and facilitated diffusion
- explain how salt water moves across the cell membrane in a hogchoker via osmosis and active transport
- discuss why oxygen consumption remains constant in the lugworm, whereas oxygen consumption increases in the hogchoker as salt water concentration increases, and link this to the life process of cellular respiration.

You may use diagrams in your answer.

There is more space for your answer to this question on page 13.

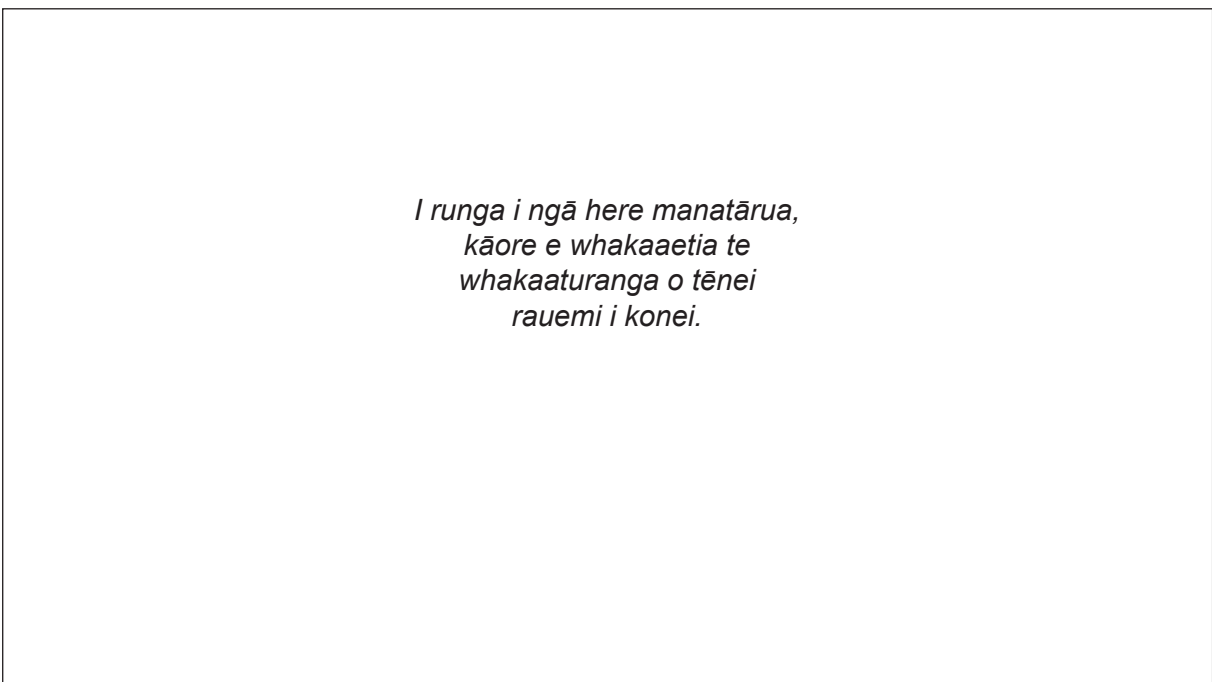
TŪMAHI TUATORU: TE AHOTAKAKAME

Ka pā mai te ahotakakame i roto i ngā pūkārīki¹, ā, e hiahiatia ana te pūngao aho.

- (a) Tātuhia he hoahoa o tētahi pūkārīki, me te tapa i te kiriuhi o waho, kiriuhi o roto, wēkārīki (stroma) me ngā kōpaeiti (thylakoid).



- (b) Kua kitea e ngā kaimātai koiora ka taea e ngā pūkārīki te neke i roto i te pūtau hei urupare ki te aho, ā, ko ngā pūkārīki o ngā tipu whakamarumarū he nui ake i ngā pūkārīki o ngā tipu whakamarumarū-kore.



<http://www.shutterstock.com/video/clip-3943691-stock-footage-chloroplasts-in-the-living-plant-cells-under-microscope-magnification-x-phase-contrast.html>

¹ pūmāota

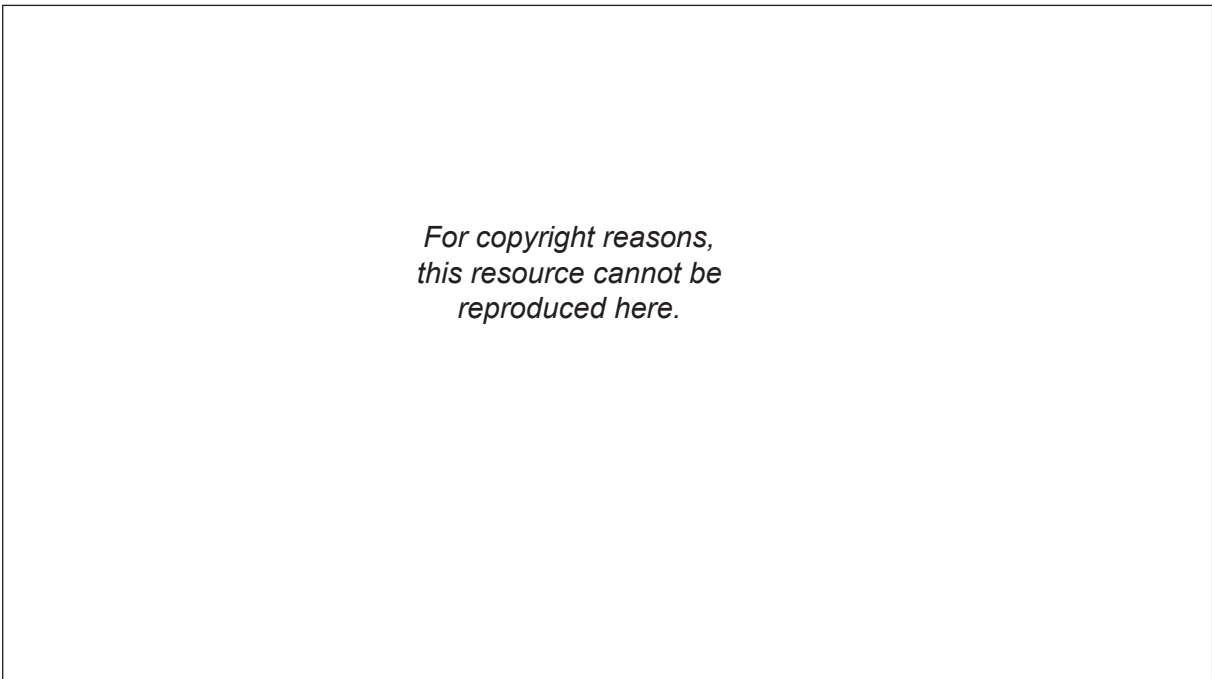
QUESTION THREE: PHOTOSYNTHESIS

Photosynthesis occurs in the chloroplasts, and requires light energy.

- (a) Draw a diagram of a chloroplast, labelling the outer membrane, inner membrane, stroma, and thylakoid.



- (b) Biologists have found that chloroplasts can move within the cell in response to light availability, and that shade plant chloroplasts are bigger than non-shade plant chloroplasts.



<http://www.shutterstock.com/video/clip-3943691-stock-footage-chloroplasts-in-the-living-plant-cells-under-microscope-magnification-x-phase-contrast.html>

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

TAU TŪMAHI

MĀ TE
KAIMĀKA
ANAKE

English translation of the wording on the front cover

Level 2 Biology, 2015

91156 Demonstrate understanding of life processes at the cellular level

9.30 a.m. Monday 16 November 2015
Credits: Four

91156M

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of life processes at the cellular level.	Demonstrate in-depth understanding of life processes at the cellular level.	Demonstrate comprehensive understanding of life processes at the cellular level.

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.