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2

91156M



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Tuhia he (☒) ki te pouaka mēnā
kāore koe i tuhi kōrero ki tēnei puka



NZQA

Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Te Mātai Koiora, Kaupae 2, 2023

91156M Te whakaatu māramatanga ki ngā tukanga ora i te taumata pūtau

Ngā whiwhinga: E whā

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki ngā tukanga ora i te taumata pūtau.	Te whakaatu māramatanga ki ngā tukanga ora i te taumata pūtau, kia hōhonu.	Te whakaatu māramatanga ki ngā tukanga ora i te taumata pūtau, kia tōtōpū.

Tirohia kia kitea ai 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.

Ki te hiahia wāhi atu anō koe mō ō tuhinga, whakamahia ngā whārangi wātea kei muri o tēnei pukapuka.

Tirohia kia kitea ai e tika ana te raupapatanga o ngā whārangi 2–19 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

Kaua e tuhi ki tētahi wāhi e kitea ai te kauruku whakahāngai (AE RUHQ / TE WĀHĀNGAI). Ka poroa taua wāhanga ka mākahia ana te pukapuka.

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

TE TŪMAHI TUATAHI: TE AHOTAKAKAME ME NGĀ PŪMUA WHĀKŌKĪ

Ko te ahotakakame te tauhohe ka whakahaerehia e te pūmua whākōkī, e noho ai ngā pūmatū hohe o te tukanga hei matū mā ngā pūmua whākōkī ahotakakame. Nā reira, ka pāngia te ahotakakame e ngā āhuatanga o te taiao, pērā i te paemahana me te kukūtanga o te matū.

(a) Tuhia te **katoa** o te whārite ā-kupu mō te ahotakakame.

(b) Matapakina te āhua o te pānga a te paemahana me te kukūtanga o te matū ki te tukanga o te ahotakakame.

I tō tuhinga, me kōrero mō te **wāhangā ngoiaho** me te **wāhangā aho wehe** o te ahotakakame, me whai wāhi hoki tētahi matapakinga o:

- tētahi pūmua whākōkī, tae atu ki tētahi whakaahuatanga
 - ngā pūmatū hohe tuatahi o ngā tauhohe ahotakakame, otirā, me whakaingoa i aua pūmatū hohe me te āhua o ngā pānga a ērā ki te ahotakakame
 - te āhua me te take e pā atu ai ngā paemahana tino wera, tino makariri hoki ki te mahi a te pūmua whākōkī me te ahotakakame.
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*He wāhi anō mō tō tuhinga
mō tēnei tūmahī kei te
whārangī e whai ake nei.*

QUESTION ONE: PHOTOSYNTHESIS AND ENZYMES

Photosynthesis is an enzyme-controlled reaction where the reactants of the process are the substrates for the photosynthesis enzymes. Therefore, photosynthesis can be affected by environmental factors such as temperature and substrate concentration.

- (a) Write the **complete** word equation for photosynthesis.
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- (b) Discuss how both temperature and substrate concentration can affect the process of photosynthesis.

In your answer, refer to the **light-dependent** and **light-independent phases** of photosynthesis, and include a discussion of:

- an enzyme, including a description
 - the starting reactants of the photosynthesis reactions, naming them, and how they affect photosynthesis
 - how and why both very high and very low temperatures affect enzyme function and photosynthesis.
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*There is more space for
your answer to this question
on the following page.*

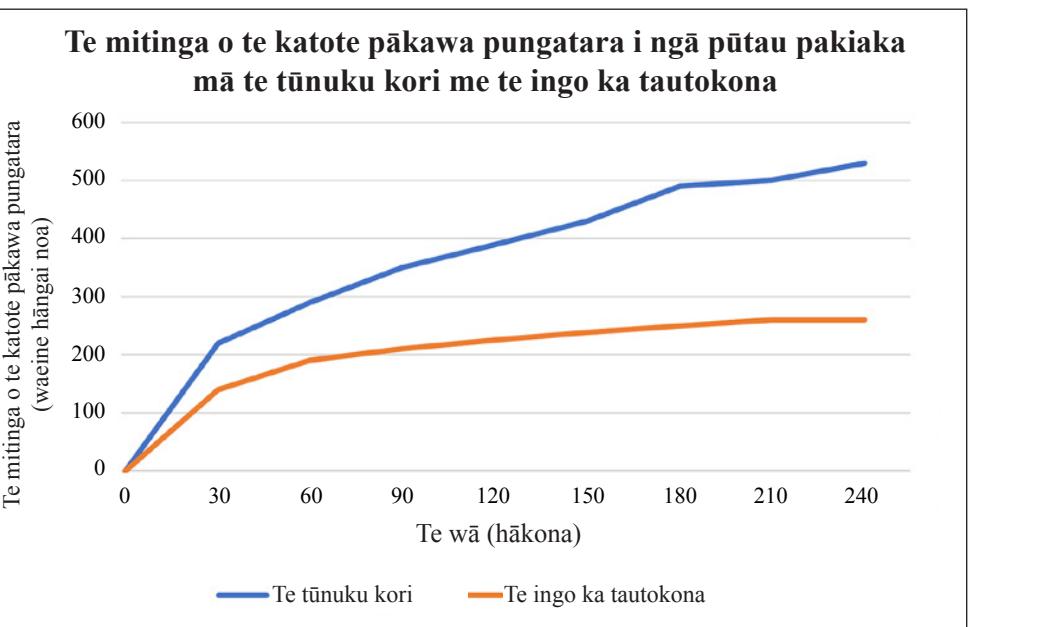
TE TŪMAHI TUARUA: TE NEKE MATŪ

Ka miti ngā tipu i ngā matū i te oneone mā ngā pūtau i ngā pakiaka. Ka kuhu ētahi katote, pērā i te katote pākawa pungatara, i ngā pūtau pakiaka mā te ingo ka tautokona, mā te tūnuku kori hoki.



Te hanganga o te kiriuhī o te pūtau

I tētahi whakatewhatewhatanga o te mitinga o ngā katote pākawa pungatara i ngā pūtau pakiaka, i puta ēnei kitenga:



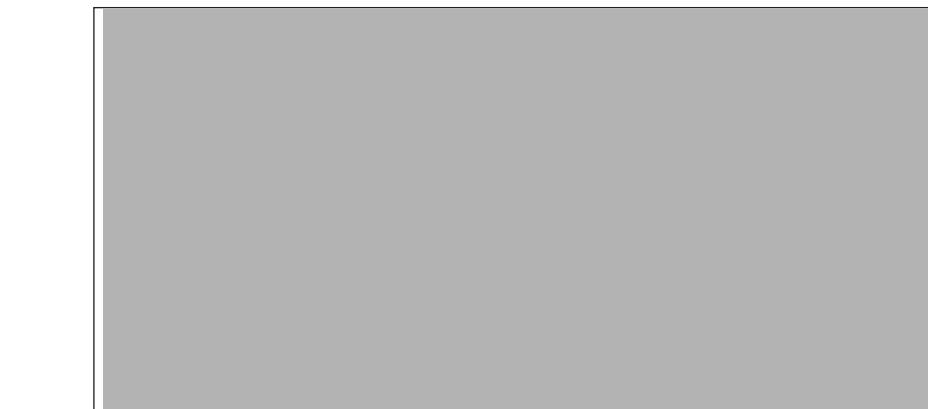
Matapakina te āhua o ngā hanganga whāiti i te kiriuhī o te pūtau e kaha ai tā ērā nuku i te katote pākawa pungatara ki te pakiaka o te tipu.

I tō tuhinga, me kōrero mō te kauwhata o runga nei, ā, me kōrero hoki mō:

- te tūnuku kori, tae atu ki tētahi whakaahuatanga me te take o te whakamahinga ūna
- te ingo ka tautokona, tae atu ki tētahi whakaahuatanga me te take o te whakamahinga ūna
- ngā ūritetanga me ngā rerekētanga i waenga i te tūnuku kori me te ingo ka tautokona
- ngā take mō ngā rerekētanga i te mitinga o te katote pākawa pungatara, e kitea ana i te kauwhata.

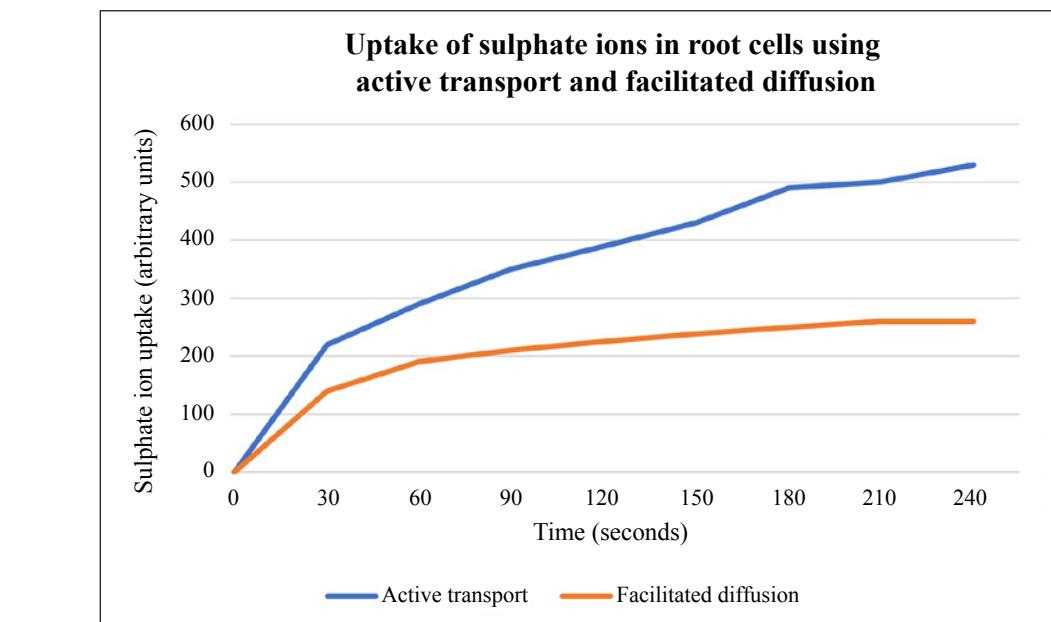
QUESTION TWO: TRANSPORT OF MATERIALS

Plants absorb materials from the soil through the cells in their roots. Some ions, such as the sulphate ion, can enter the root cells by both facilitated diffusion and active transport.



Structure of cell membrane

In an investigation of the uptake of sulphate ions by root cells, the following results were obtained:



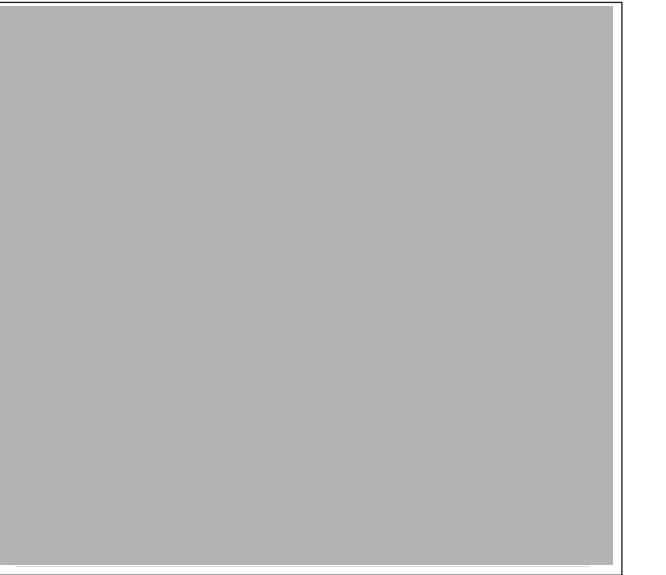
Discuss how specific structures in the cell membrane allow it to carry out the transport of the sulphate ion into the plant root.

In your answer, refer to the graph above and include a discussion of:

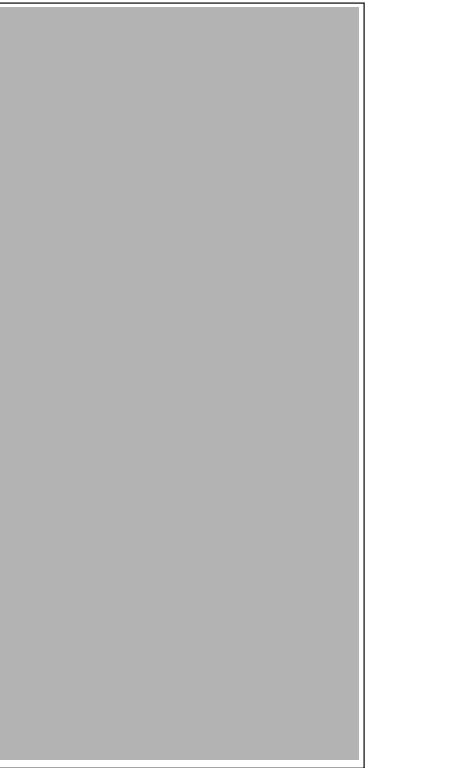
- active transport, including a description, and why it would be used
- facilitated diffusion, including a description, and why it would be used
- the similarities and differences between active transport and facilitated diffusion
- the reasons for the differences in sulphate ion absorption, as shown in the graph.

TE TŪMAHI TUATORU: TE WHĀŪ PŪIRA ME TE TĀRUA I TE PĪTAU IRA

He tukanga whakahirahira te tārua i te pītau ira me te whāū pūira ki ngā kīrehe.



Te hurihangora o te pūrerehua



Te tāruatanga o tētahi aho
pītau ira

Matapakina te hononga i waenga i te tāruatanga o te pītau ira me te whāū pūira, me te take me mātua puta aua āhuatanga e ora tonu ai te pūtau me te rauropi katoa anō hoki.

I tō tuhinga, me whai wāhi ngā kōrero mō:

- te wā ka kitea te tāruatanga o te pītau ira, tae atu ki tētahi whakaahuatanga, me te āhua o te rere o te tukanga
- te whāū pūira, tae atu ki tētahi whakaahuatanga, me tōna pūtake
- te take me mātua puta te whāū pūira, mā te kōrero mō ngā wāhangā o te hurihangora ora o te pūrerehua, e kitea ana i runga nei.

QUESTION THREE: MITOSIS AND DNA REPLICATION

DNA replication and mitosis are important processes for animals.



Life cycle of a butterfly



Replication of a DNA strand

Discuss the relationship between DNA replication and mitosis, and why both are needed for the survival of both a cell and the entire organism.

In your answer, include a discussion of:

- when DNA replication occurs, including a description, and how the process is carried out
- mitosis, including a description, and its purpose
- why mitosis is needed, by referring to stages of a butterfly's life cycle, as shown above.

**He whārangi anō ki te hiahiatia.
Tuhia te tau tūmahī mēnā e hāngai ana.**

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

QUESTION
NUMBER

**He whārangi anō ki te hiahiatia.
Tuhia te tau tūmahi mēnā e hāngai ana.**

TE TAU
TŪMAHI

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

QUESTION
NUMBER

Ngā Mihi

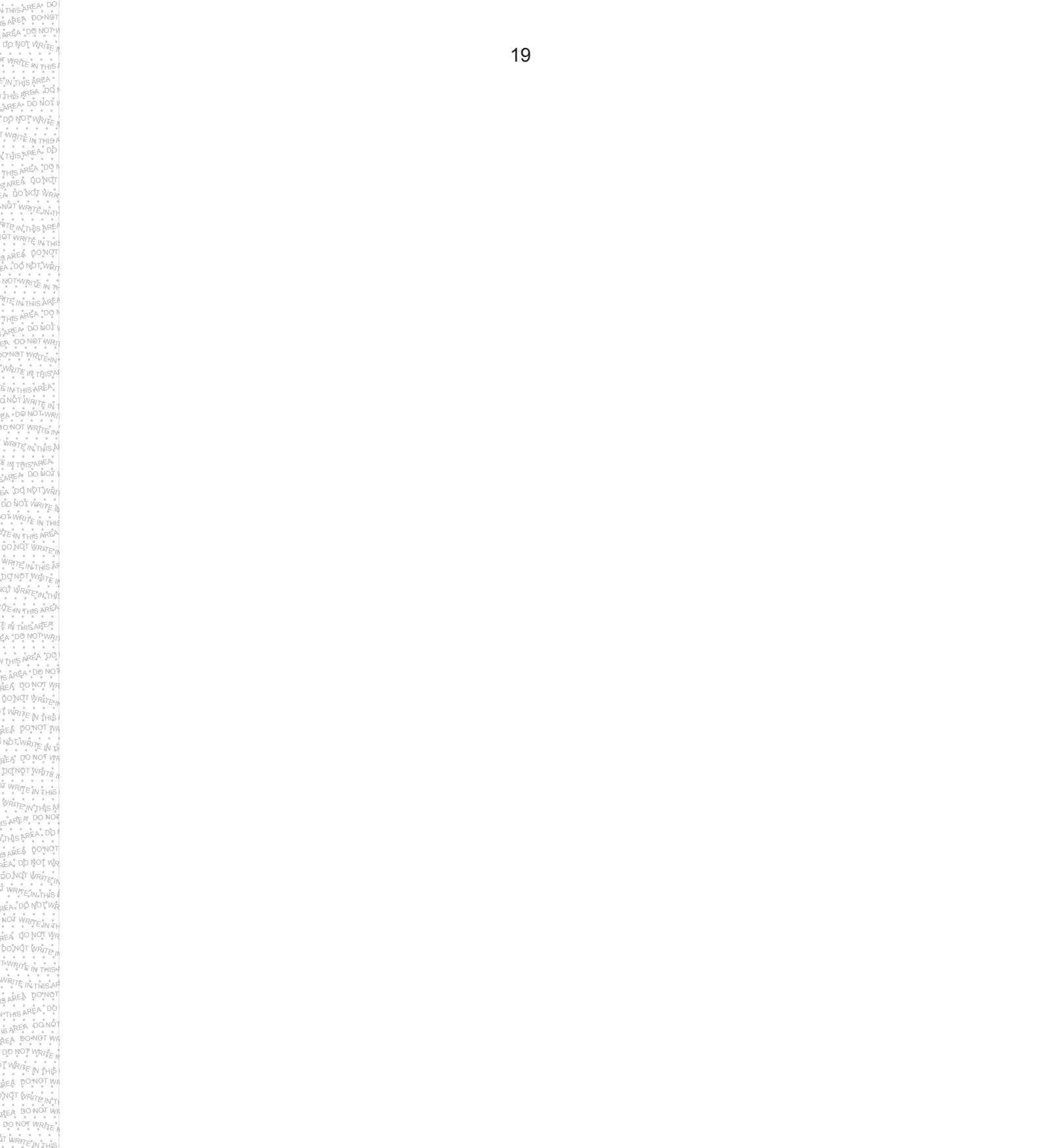
He mea whakahāngai ngā kōrero i ngā mātāpuna e whai ake nei hei whakamahinga i tēnei aromatawai:

Te whārangī 10

Te whakaahua: <https://www.pathwayz.org/Tree/Plain/ORGANELLES>
 Ngā raraunga: <https://practicalbiology.org/exchange-of-materials/active-uptake/tracking-active-uptake-of-minerals-by-plant-roots>

Te whārangī 18

Ngā whakaahua: <https://www.floridamuseum.ufl.edu/educators/resource/butterfly-life-cycle/>
<https://www.zarkanderson.com/2010/10/self-dna-repair.html>



Acknowledgements

Material from the following sources has been adapted for use in this assessment:

Page 10

Image: <https://www.pathwayz.org/Tree/Plain/ORGANELLES>

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Page 18

Images: <https://www.floridamuseum.ufl.edu/educators/resource/butterfly-life-cycle/>
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English translation of the wording on the front cover

91156M

Level 2 Biology 2023

91156M Demonstrate understanding of life processes at the cellular level

Credits: Four

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

Check that this booklet has pages 2–19 in the correct order and that none of these pages is blank.

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

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