

91159M



911595



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

2

SUPERVISOR'S USE ONLY

Koiora, Kaupae 2, 2016

91159M Te whakaatu māramatanga ki te whakatinana ira

9.30 i te ata Rāmere 18 Whiringa-ā-rangi 2016
Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki te whakatinana ira.	Te whakaatu māramatanga hōhonu ki te whakatinana ira.	Te whakaatu māramatanga matawhānui ki te whakatinana ira.

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 te (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: NGĀ WAIKAWA KARIHI

- (a) Ka whai wāhi te pītau ira (DNA) me te waikawa tuipūmua (RNA) ki te kōtui pūmua.

Whakaahuatia te hanganga o te pītau ira me te waikawa tuipūmua.

Ka whakaaetia te whakamahi hoahoa hei tautoko i tō tuhinga.



QUESTION ONE: NUCLEIC ACIDSASSESSOR'S
USE ONLY

- (a) Deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) are both involved in protein synthesis.

Describe the structure of DNA and RNA.

You may use diagrams in your answer.



TŪMAHI TUARUA: NGĀ ĀHUATANGA TAIAO ME TE WHAKATINANATANGA IRA

E rua ngā tohuāhua uwaha o te pī mīere (*Apis mellifera*).

Momo uwaha	Kai Torongū	Tohuāhua Pakeke	Tohuira
Pī huauri ¹	tiere roera	<ul style="list-style-type: none"> rahi wharekano nui ake papatipu tinana nui ora mō te 2 tau 	ōrite
Pī kaimahi	tiere roera mō te 3 rā, i muri mai ko te hae me te mīere anake	<ul style="list-style-type: none"> wharekano matapā papatipu tinana paku ake ora mō te 3 – 6 wiki 	

www.britannica.com/media/full/171791/141787

(a) Whakamāramahia mai ngā kupu 'whakatinanatanga ira'.

(b) Whakamāramahia mai he aha i tino pai ai te whakataurite i ngā pī mīere kaimahi uwaha me ngā pī mīere huauri uwaha mō ngā whakamātautau e pā ana ki ngā take taiao me te whakatinana ira.

QUESTION TWO: ENVIRONMENTAL FACTORS AND GENE EXPRESSION

ASSESSOR'S
USE ONLY

The honey bee (*Apis mellifera*) has two female phenotypes.

Female type	Larvae Diet	Adult phenotype	Genotype
Queen bee	royal jelly	<ul style="list-style-type: none"> • increased ovary size • large body mass • live for 2 years 	the same
Worker bee	royal jelly for 3 days, then only pollen and honey	<ul style="list-style-type: none"> • infertile ovaries • smaller body mass • live for 3 – 6 weeks 	

www.britannica.com/media/full/171791/141787

(a) Describe the term gene expression.

(b) Explain why comparing worker and queen honey bee females is ideal for experiments on environmental factors and gene expression.

TŪMAHI TUATORU: NGĀ IRAKĒTANGA

(a) Whakaahuatia he aha te irakētanga.

**Ka haere tonu te Tūmahi
Tuatoru i te whārangi 16.**

QUESTION THREE: MUTATIONS

- (a) Describe what a mutation is.

ASSESSOR'S
USE ONLY

**Question Three continues
on page 17.**

- (b) Neke atu i te 1000 ngā irakētanga e pā mai ai te mate hūware tāpiapia. Ko tētahi irakētanga noa ko tētahi irakētanga whakakore e kore ai e puta tētahi waikawa amino kotahi ki te pūmua whakamutunga. Ko tētahi atu irakētanga he irakētanga whakakapi e puta ai tētahi waikawa amino rerekē i roto i te pūmua whakamutunga.

Matapakitia he pēhea te whai pānga o ēnei irakētanga e rua ki te pūmua whakamutunga o te ira o te mate hūware tāpiapia me te tohuāhua ka puta.

Me whakauru ki roto i tō tuhinga:

- he whakamāramatanga he aha e kore atu ai tētahi waikawa amino kotahi mai i te pūmua whakamutunga nā te irakētanga whakakore, ā, he pēhea te whai pānga o tēnei ki te pōkai pūmua
- he whakamāramatanga he aha i puta mai ai i te irakētanga whakakapi tētahi waikawa amino rerekē ki roto i te pūmua whakamutunga, ā, he pēhea te whai pānga o tēnei ki te pōkai pūmua
- he matapakinga he aha i puta mai ai i te irakētanga whakakore te mate hūware tāpiapia taumaha, ēngari he māmā ake te mate hūware tāpiapia ka puta i te irakētanga whakakapi.



He wāhi anō mō tō tuhinga mō tēnei tūmahi kei te whārangi 18.

- (b) There are over 1000 mutations that can cause cystic fibrosis. A common mutation is a deletion mutation that results in the absence of one amino acid in the final protein. Another mutation is a substitution mutation that results in a different amino acid in the final protein.

Discuss how these two mutations affect the cystic fibrosis gene's final protein and resulting phenotype.

In your answer include:

- an explanation of why the deletion mutation causes one amino acid to be absent in the final protein, and how this affects protein folding
- an explanation of why the substitution mutation causes a different amino acid to be present in the final protein, and how this affects protein folding
- a discussion of why the deletion mutation causes severe cystic fibrosis disease, whereas the substitution mutation causes milder cystic fibrosis disease.



Chromosome 7

Cystic
fibrosis
gene

There is more space for your answer to this question on page 19.

English translation of the wording on the front cover

Level 2 Biology, 2016

91159 Demonstrate understanding of gene expression

9.30 a.m. Friday 18 November 2016
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of gene expression.	Demonstrate in-depth understanding of gene expression.	Demonstrate comprehensive understanding of gene expression.

91159M

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.