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91159M





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 tuhinga, 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

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.		
a whakaaetia te whakamahi hoahoa hei tautoko i tō tuhinga.		

MĀ TE KAIMĀKA ANAKE

QUESTION ONE: NUCLEIC ACIDS

ASSESSOR'S USE ONLY

Describe the struc	ture of DNA and	l RNA.		
You may use diag				
roa may aso arag.	and in your and	,,,,,		

Matapakitia te hiranga o ēnei i roto i te hanga pūmua, me te take he aha i hangaia tonuhia ai e te pūtau ngā rāpoi ngota mRNA, ēngari kaua ngā rāpoi ngota pītau ira, i te wā o te kōtui pūmua.				
Me	whakauru ki roto i tō tuhinga:			
•	he whakamāramatanga o te mahi a te rāpoi ngota pītau ira, mRNA, me te tRNA			
•	he whakamārama mō te puakanga mai o te mRNA			
•	he matapakinga o te hiranga o te pītau ira, mRNA, me te tRNA mō te hanga pūmua whāiti.			

MĀ TE KAIMĀKA ANAKE

He wāhi anō mō tō tuhinga mō tēnei tūmahi kei te whārangi 6. (b)

DNA	A, mRNA, and tRNA are all involved in the formation	of proteins.	ASSESSOR'S USE ONLY
	uss the significance of these molecules in forming pro- es mRNA molecules, but not DNA molecules, during		
In yo	our answer include:		
•	an explanation of the function of DNA, mRNA, and	tRNA molecules	
•	an explanation of how mRNA is produced		
•	a discussion of the significance of DNA, mRNA, an	d tRNA in forming specific proteins.	
	2	<i>5</i> 1 1	
	r		
		There is more space for your	
		answer to this question on page 7.	

MĀ TE KAIMĀKA ANAKE
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TŪMAHI TUARUA: NGĀ ĀHUATANGA TAIAO ME TE WHAKATINANATANGA IRA

MĀ TE KAIMĀKA ANAKE

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

Momo uwha	Kai Torongū	Tohuāhua Pakeke	Tohuira
Pī huauri ¹	tiere roera	 rahi wharekano nui ake papatipu tinana nui ora mō te 2 tau 	
Pī kaimahi	tiere roera mō te 3 rā, i muri mai ko te hae me te mīere anake	 wharekano matapā papatipu tinana paku ake ora mō te 3 – 6 wiki 	ōrite

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

	māramahia mai he aha i tino pai ai te whakataurite i ngā pī mīere kaimahi uw pī mīere huauri uwha mō ngā whakamātautau e pā ana ki ngā take taiao me
whakat	inana 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	increased ovary sizelarge body masslive for 2 years	
Worker bee	royal jelly for 3 days, then only pollen and honey	 infertile ovaries smaller body mass live for 3 – 6 weeks 	the same

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

(a)

Describe the term gene expression.

comparing worker and qual factors and gene express	s is ideal for experiments or

(c)

	He wāhi anō mō tō tuhinga mō tēnei tūmahi kei te whārangi 12.
	he matapakinga he aha i tino whakatinanahia ai te tohuāhua o te pī huauri, engari kīhai te tohuāhua o te pī kaimahi.
	he matapakinga he pēhea te huri o te tohuāhua o te pī miere me te kore huri i te tohuira
	mā te whakamahi i tētahi tauira, he whakamāramatanga o te rerekētanga i waenga i te take taiao me te matū whakakē ira
	he whakaahuatanga o te take taiao e whai pānga ana ki te tohuāhua o te pī mīere
W	hakauru ki roto i tō tuhinga:
	pakitia te pānga o te taiao ki te whakatinanatanga o te tohuāhua i ngā uwha pī mīere.

(c)	Exp	periments have confirmed that royal jelly is not a mutagen.	ASSESSOR USE ONLY					
		cuss the effect the environment has on the expression of the phenotype in honey bee nales.						
	In your answer include:							
	•	a description of the environmental factor that affects honey bee phenotype						
	•	using an example, an explanation of the difference between environmental factor and mutagen						
	•	a discussion of how honey bee phenotype can change without changing the genotype						
	•	a discussion of why the queen bee's phenotype is fully expressed, but the worker bee's phenotype is not.						
		There is more space for your answer to this question on page 13.						

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ASSESSOR'S USE ONLY
USE ONE.

TŪMAHI TUATORU: NGĀ IRAKĒTANGA

MĀ TE KAIMĀKA ANAKE

Ka haere tonu te Tūmahi Tuatoru i te whārangi 16.

QUI	QUESTION THREE: MUTATIONS						
(a)	Describe what a mutation is.						

Question Three continues on page 17.

ASSESSOR'S USE ONLY

Neke atu i te 1000 ngā irakētanga e pā mai ai te mate hūware tāpiapia. (b) 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 Ira o te i roto i te pūmua whakamutunga. mate hūware Matapakitia he pēhea te whai pānga o ēnei irakētanga e rua ki te pūmua tāpiapia 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 Pūira 7 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 irāketanga 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.

ASSESSOR'S USE ONLY

(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. Cystic Discuss how these two mutations affect the cystic fibrosis gene's final fibrosis gene 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 Chromosome 7 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. There is more space for your

answer to this question on

page 19.

MĀ KAIN ANA

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	He whārangi anō ki te hiahiatia.	MĀ TE KAIMĀKA
TAU TŪMAHI	Tuhia te (ngā) tau tūmahi mēnā e tika ana.	ANAKE

		Extra paper if required.	
QUESTION NUMBER		Write the question number(s) if applicable.	

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.

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.