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90948M



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

# Pūtaiao, Kaupae 1, 2016

## 90948M Te whakaatu māramatanga ki ngā ariā koiora e pā ana ki te rerekētanga ā-ira

9.30 i te ata Rāhina 14 Whiringa-ā-rangi 2016 Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki ngā ariā koiora e pā ana ki te rerekētanga ā-ira.	Te whakaatu māramatanga hōhonu ki ngā ariā koiora e pā ana ki te rerekētanga ā-ira.	Te whakaatu māramatanga matawhānui ki ngā ariā koiora e pā ana ki te rerekētanga ā-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 ngā whārangi wātea kei muri o tēnei pukapuka, ka āta tohu ai i te tau tūmahi.

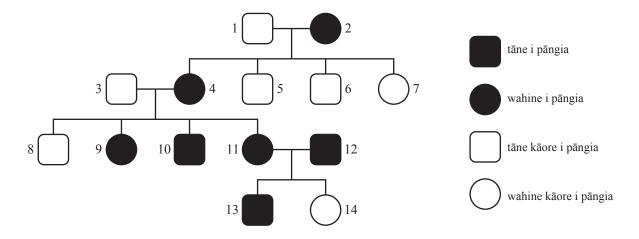
Tirohia mēnā e tika ana te raupapatanga o ngā whārangi 2–15 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

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

TAPEKE

#### TŪMAHI TUATAHI

Ko te mate mātihetihe ā-aho he mate matihe ka pā ki te tangata nā te aho tīahoaho. Ka kitea i roto i tētahi whānau, e ai ki te tūtohi kāwai i raro. He ngoi te mate mātihetihe ā-aho (A) ki te hunga kāore i pāngia (a).



1	XX71 1 / 1 *	- , 1 :		1 -	1 1
(a	) Whakatauhia	nga tahiiira	O noa tanoata	e wha e	what ake
(u	<i>y</i> v makataama	iiga toilulla	o nga tangata	c wila c	Wilai aixc

1	2
11	12

(b) Whakamāramahia mai me pēhea te whakamahi i te tūtohi kāwai hei whakaatu he ngoi te mate mātihetihe ā-aho, ēngari kāore e taea te whakamahi hei whakatau i te tohuira o te tangata 13.

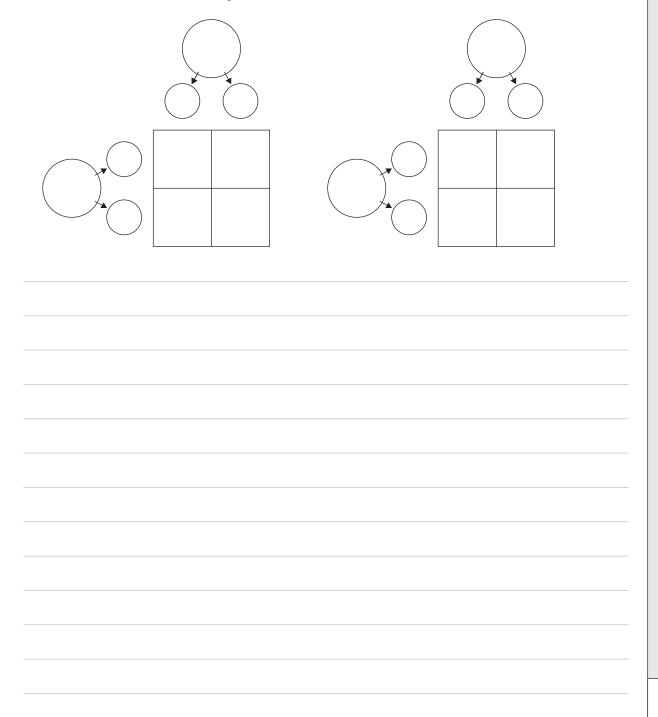
Ka tāea e koe te whakamahi te tūtohi Punnett.		

Kua puta i te moenga o 3 me 4 i roto i te tūtohi kāwai ngā uri **e toru e pāngia ana e te mate mātihetihe ā-aho**.

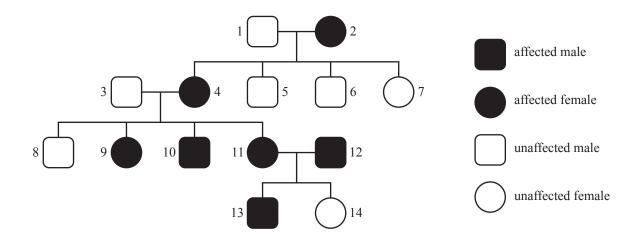
Whakamāramahia mai te rerekētanga ki te maha o ngā uri kua pāngia e te mate mātihetihe ā-aho i roto i ēnei moenga e rua.

I tō tuhinga me:

- whakaoti i ngā tūtohi Punnett
- homai te ōwehenga tohuāhua i tūmanakohia mō ia moenga
- kōrero mō ngā rerekētanga i waenga i te ōwehenga i tūmanakohia me te ōwehenga tohuāhua ake mō ia moenga.



Photic sneezing is a condition which causes affected people to sneeze due to bright light. It can be traced through a family, as shown in the pedigree chart. Photic sneezing (A) is dominant to unaffected (a).



(a) Work out the genotypes of the following four individuals:

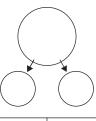
1			

2			

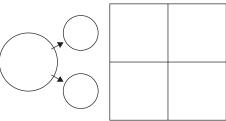
11			

You may use the Punnett square.

(b) Explain how the pedigree chart can be used to show that Photic sneezing is dominant, but it cannot be used to determine the genotype of individual 13.





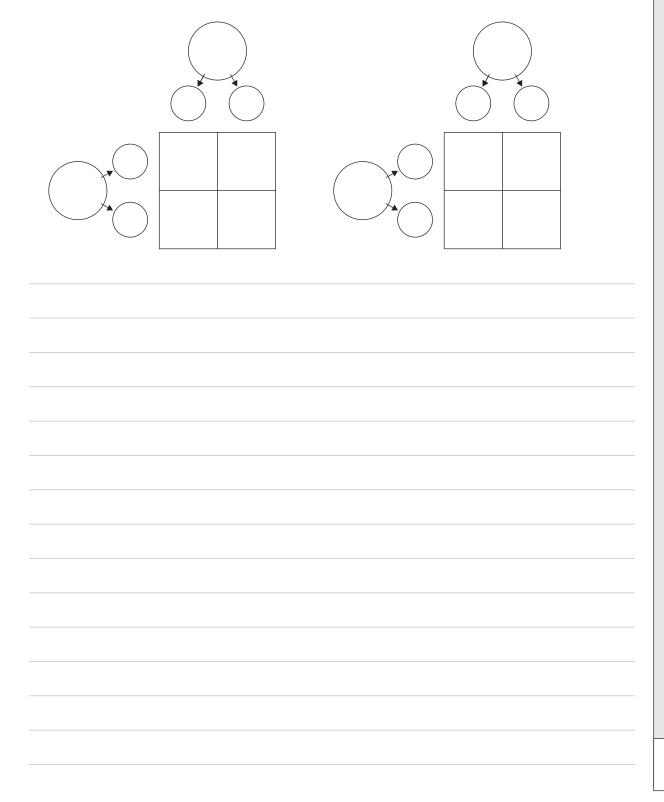


(c) The cross between 1 and 2 in the pedigree chart has **one affected sneezing** offspring.

The cross between 3 and 4 in the pedigree chart has **three affected sneezing** offspring.

Explain the difference in the number of affected offspring (photic sneezers) in these 2 crosses. In your answer you should:

- complete Punnett squares
- give the expected phenotype ratio for each cross
- account for any difference between the expected ratio and the actual phenotype ratio for each of the crosses.



## TŪMAHI TUARUA

MĀ TE
KAIMĀKA
ANAKE

He huruhuru pariko, huruhuru kehu rānei tō ngā kiore iti pūkoro toka, e ai ki te pikitia i raro.		
	uv disaavanlifa ava/mn/20a2aavah=Chaatadinu	
	w.discoverlife.org/mp/20q?search=Chaetodipu www.flickriver.com/photos/tags/broadcanyonbioblitz/interesting/s+intermedius&mobile=close&flags=glean:	
(a)	Mā te whakamahi i te tauira o te tae huruhuru o te kiore iti pūkoro toka, whakamāramahia mai he pēhea ngā mōhiohio e kawea ana i te pītauira e whakahaere ai i te āhua.	
	I tō tuhinga, me kōrero koe mō te raupapa pāpāhua pītauira, ngā ira me ngā āhuaira.	

## **QUESTION TWO**

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Rock pocket mice can have dark fur or light fur, as shown below.	
www.discoverlife.org/mp/20q?search=Chaetodipu www.flickriver.com/photos/tags/broadcanyonbioblitz/interesting/	
s+intermedius&mobile=close&flags=glean:	
(a) Using the example of rock pocket mouse fur colour, explain how information carried on the DNA controls the appearance.	
In your answer you should refer to DNA base sequence, genes and alleles.	

)	I ng	ā kiore iti pūkoro toka he ngoi te tae huruhuru pariko (D) ki te tae huruhuru kehu (d).					
	E rua ngā āhuaira o ia kiore iti mō te tae huruhuru.  Whakamāramahia mai ka pēhea tā rātou whiwhi i ēnei āhuaira e rua, ka whakamārama mai i te āhua o te pāhekoheko o ēnei āhuaira e rua kia puta ai ngā tohuāhua rerekē e rua.  I tō tuhinga me:						
	•	tautuhi he aha te tohuāhua me te tohuira					
	•	whakamārama mai he pēhea te whakaheke o ngā āhuaira mai i ngā kātua					
	•	tuhituhi ngā tohuira tae huruhuru e toru ka tāea mō ngā kiore iti pūkoro toka.					

In rock pocket mice, dark fur colour (D) is dominant to light fur co Each mouse has two alleles for fur colour.			
Explain how they inherit these two alleles, and explain how the two alleles interact to produce different phenotypes.			
n your answer you should:			
define phenotype and genotype			
explain how the alleles are inherited from the parents			
state the three possible fur colour genotypes for rock pocket	mice.		

#### **TŪMAHI TUATORU**

Ko te Venus flytrap (*Dionaea muscipula*) he tipu ēnei e noho ana i ngā oneone iti te mōmona. He rau ōna i āta urutautia, ā, ka tere kati hei hopu ngārara.

He whakaputa uri tōrua ngā tipu, he whakaputa putiputi.

(a) Matapakitia ngā huapai o te whakaputa uri tōrua.

I tō tuhinga me:

- tautuhi he aha te whakaputa uri tōrua
- www.flickr.com/photos/david\_jones/5256437760
- whakamārama mai i tētahi tukanga hira KOTAHI i roto i te whakaputa uri tōrua ka āwhina ki te whakaputa uri rerekē

whakamārama mai he aha i whai hua ai ki te taupori o te Venus flytrap te rerekētanga nā

te whakaputa uri tōrua i roto i ngā reanga.

MĀ TE KAIMĀKA ANAKE

#### **QUESTION THREE**

Venus flytraps (*Dionaea muscipula*) are plants that live in poor quality soils. They have specially adapted leaves that snap shut to catch insects.

The plants reproduce sexually, involving the production of flowers.

(a) Discuss the advantages of sexual reproduction.

In your answer you should:

www.flickr.com/photos/david\_jones/5256437760

- define sexual reproduction
- explain how ONE important process in sexual reproduction helps to produce variation in offspring

•	explain how variation as a result of sexual reproduction can benefit the Venus flytrap plant population over generations.			

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(b)	Ka ahu mai ngā tipu Venus flytrap mai i ngā	MĀ T KAIMĀ
	momo rerekē maha, pēnei i te "B-52" me tana rau whero.	ANAK
	I heria mai e tētahi kaiako ngā tipu ritepū e rua ka waiho ki ngā wāhanga rerekē o te akomanga.	
	He poto ake te tipu o ngā rau o te Venus flytrap i	
	waiho tūtata ki te matapihi, ā, ko te Venus flytrap i waiho i te marumaru i roa te tipu o ana rau.	
	i wamo i te marumaru i roa te upu o ana iau.	
	Ka tāea te tuku haere o te tae rerekē o ngā rau o te	
	Venus flytrap ki ngā uri o tētahi tipu, ēngari kaua https://commons.wikimedia.org/wiki/File:Venus_te roa rerekē o te rau. <b>Whakamāramatia he aha ai.</b> FlytrapB-52.jpg	
	I tō tuhinga me:	
	<ul> <li>tautuhi he aha te rerekētanga tuku iho me te rerekētanga kore tuku iho</li> </ul>	
	<ul> <li>whakamārama mai he aha te pūtake o ngā rerekētanga tuku iho, kore tuku iho rānei.</li> </ul>	
	whakamarama mar ne ana te patake o nga rereketanga taka mo, kore taka mo raner.	

(b)	A te and The leav	Venus flytrap plants come in a number of erent types, such as the "B-52" with a red leaf. eacher brought two identical plants to class put them in different parts of the classroom. Venus flytrap put near a window grew short res and the Venus flytrap in the shade grew g leaves.		ASSESSOR' USE ONLY
	flytr but	our variation in the leaves of the Venus raps can be passed on to a plant's offspring, the different leaf length cannot. <b>Explain why.</b> our answer you should:	https://commons.wikimedia.org/wiki/File:Venus_FlytrapB-52.jpg	
	•	define inheritable and non-inheritable variation	n	
	•	explain what causes inheritable and non-inher	itable variations.	

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

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

## English translation of the wording on the front cover

## Level 1 Science, 2016

# 90948 Demonstrate understanding of biological ideas relating to genetic variation

9.30 a.m. Monday 14 November 2016 Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of biological deas relating to genetic variation.	Demonstrate in-depth understanding of biological ideas relating to genetic variation.	Demonstrate comprehensive understanding of biological ideas relating to genetic variation.

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 and clearly number the question.

Check that this booklet has pages 2–15 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.