

90948M

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SUPERVISOR'S USE ONLY

# Pūtaiao, Kaupae 1, 2013

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

9.30 i te ata Rāhina 18 Whiringa-ā-rangi 2013 Whiwhinga: Whā

Paetae	Paetae Kaiaka	Paetae 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 mehemea e ōrite ana te Tau Ākonga ā-Motu (NSN) kei tō pepa whakauru ki te tau kei runga ake nei.

Me whakautu e koe ngā pātai KATOA kei roto i te pukapuka nei.

Ki te hiahia koe ki ētahi atu wāhi hei tuhituhi whakautu, whakamahia te (ngā) whārangi kei muri i te pukapuka nei, ka āta tohu ai i ngā tau pātai.

Tirohia mehemea kei roto nei ngā whārangi 2–23 e raupapa tika ana, ā, kāore hoki he whārangi wātea.

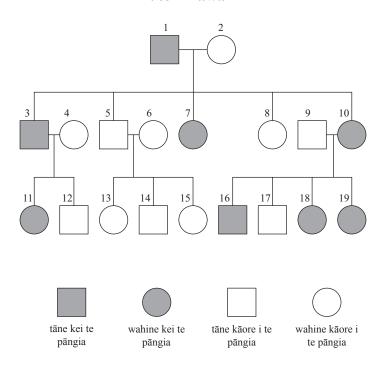
HOATU TE PUKAPUKA NEI KI TE KAIWHAKAHAERE HEI TE MUTUNGA O TE WHAKAMĀTAUTAU.

TAPEKE

#### PĀTAI TUATAHI: NGĀ KĀWAI ME NGĀ TAPAWHĀ PUNNETT

Ko te tahumaero¹ Huntington he tahumaero iranga i roto i te tangata. Ko tētahi irarā ngoi² (H) te pūtake. He ngoikore³ te irarā pūnoa (h).

#### Tūtohi kāwai



(a)	Mā te whakamahi i te H me te h, homai ngā tohuira e rua ka taea mō tētahi tangata e pāngia
	ana e te tahumaero Huntington:

(b)	Tuhia te tohu	iira o te tangata	9 i roto i te	tūtohi kāwai	i runga ake.
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Tuhia te tohuira o te tangata 10 i roto i te tūtohi kāwai i runga ake.

Whakamāramahia mai i pēhea tō whakarite i te tohuira mō te tangata 10.

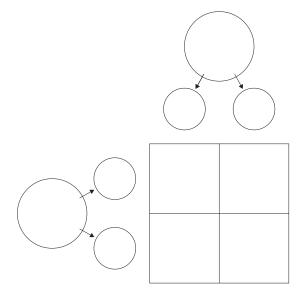
Me whai taunakitanga tō whakautu mai i ngā mātua ME ngā tamariki a te tangata 10.

<sup>&</sup>lt;sup>1</sup> mate

<sup>&</sup>lt;sup>2</sup> tāpua

<sup>&</sup>lt;sup>3</sup> huna

(c) Tuhia tētahi tapawhā Punnett hei whakaatu i ngā tohuira o ngā tamariki **ka taea** mai i ngā mātua 9 me te 10.



(i) Mai i **tō** tapawhā Punnett, matapaehia he aha te hautanga o ngā tamariki ka pāngia e te tahumaero Huntington, ā, me te hautanga kāore i te pāngia e te tahumaero Huntington.

Hautanga o ngā tamariki e pāngia ana e te tahumaero Huntington:

Hautanga o ngā tamariki kāore i te pāngia e te tahumaero Huntington:

(ii) Mā te whakamahi i tō tapawhā Punnett, whakaotihia te pouaka i raro hei whakaatu i te ōwehenga tohuāhua ka tūmanakohia mō ngā tamariki.

	Tahumaero Huntington : Kāore he tahumaero Huntington
Ōwehenga tohuāhua mai i te tapawhā Punnett	•

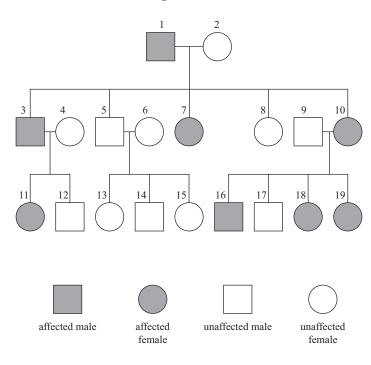
You are advised to spend 60 minutes answering the questions in this booklet.

#### ASSESSOR'S USE ONLY

#### QUESTION ONE: PEDIGREES AND PUNNETT SQUARES

Huntington's disease is a genetic disorder in humans. It is caused by a dominant allele (H). The normal allele is recessive (h).

#### **Pedigree chart**



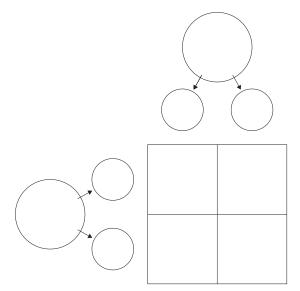
- (a) Using H and h, give the two possible genotypes for an individual who has Huntington's disease:
- (b) State the genotype of individual 9 in the pedigree chart above.

State the genotype of individual 10 in the pedigree chart above.

Explain how you worked out the genotype for individual 10.

You should support your answer using evidence from BOTH the parents AND children of individual 10.

(c) Draw a Punnett square to show the **possible** genotypes of the children from parents 9 and 10.



(i) From **your** Punnett square, predict what fraction of the children would have Huntington's disease and what fraction would not have Huntington's disease.

Fraction of children with Huntington's disease:

Fraction of children without Huntington's disease:

(ii) Using your Punnett square, complete the box below to show the expected phenotype ratio for the children.

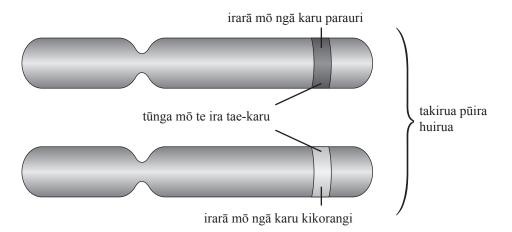
	Huntington's disease : Without Huntington's disease
Phenotype ratio from Punnett square	•

e aha i KORE ai pea e ō nga i kitea i roto i ngā ta	ne i roto i te tapawhā	
		_
		-

Give reasons why the p	predicted ratio in the Punnett s	quare and the observed ratio in the	
children may NOT be t	the same.		

## PĀTAI TUARUA: TE MAHI A TE PĪTAUIRA I ROTO I TE TUKUNGA IHO





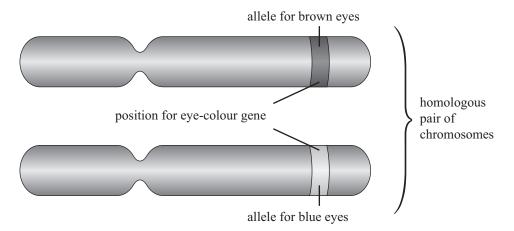
Ka taea nea e	e tētahi hoahoa v	whai tananga	te āwhina i a k	roe	
ra taca pea e	totam nounca v	viiai tapanga	to avviilla i a i		

whakautu ki tēnei pātai.

He wāhi anō māu kei te whārangi 10 mō tō

### QUESTION TWO: THE ROLE OF DNA IN INHERITANCE





(a) Use the diagram above to help you explain the relationship between chromosomes, genes, alleles, phenotype, genotype, and the molecule DNA.

A labelled diagram may assist you.

There is more space
for your answer to this question on page 12.

		-
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		-
		-
		-
	te irarā mō ngā karu parauri (B) he ngoi ake i te irarā mō ngā karu kikorangi (b) i roto i te gata.	
	tapakitia ka pēhea te whiwhi a tētahi tamaiti i ngā karu kikorangi, ahakoa he parauri ngā u o ōna mātua e rua.	
I tō	whakautu, me:	
•	whakamahi i ngā tapawhā Punnett whai tapanga	
•	hono i ngā tohuira me ngā tohuāhua o te tamaiti, ngā mātua, ME ngā tīpuna.	

(b)

MĀ KAIM.
ANA
1

	ASSESSOR' USE ONLY
Discuss how it would be possible for a child to have blue eyes, even though both the have brown eyes.	neir parents
In your answer you should:	
use labelled Punnett squares	
• link the genotypes and phenotypes of the child, parents, AND grandparents.	
min the genetypes and phenotypes of the emila, parents, in the grandparents.	

(b)

A

## PĀTAI TUATORU: WHAKAPUTA URI TŌRUA

He huapai, he huakino hoki kei roto i te whakaputa uri tōrua mō ngā tipu me ngā kararehe.

whakama	kia RUA ngā <b>huakino</b> o te whakaputa uri tōrua i roto i te <b>kararehe</b> me te rama hoki i te take he huakino ēnei.
(1.)	
(2.)	
	āramahia he pēhea te whai wāhi atu o te whakaputa uri tōrua ki te tāupetanga i pori <b>kararehe</b> .
I tō whak	autu me kōrero koe mō ngā tohuhema <sup>4</sup> , te whāiti pūira <sup>5</sup> me te whakatōnga.

MĀ TE KAIMĀKA ANAKE

<sup>&</sup>lt;sup>4</sup> pūtau hema <sup>5</sup> maiohi

## **QUESTION THREE: SEXUAL REPRODUCTION**

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For both plants and animals, there are advantages and disadvantages to sexual reproduction.

disadvantages	<del></del>
1.)	
2.)	
Explain how	sexual reproduction contributes to variation in a population of <b>animals</b> .
n your answe	rer you should refer to gametes, meiosis and fertilisation.

	oke, kāore he ua, he tino	in ranci w uaj.	
rautokona o w	nakautu ki ētahi tauira.		
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	her, when there is no or very little rain).
Support	your answers with examples.

### PĀTAI TUAWHĀ: TE RĒWERA O TAHIMĀNIA

KAIMĀKA ANAKE

Pānuihia ngā mōhiohio i raro nei hei āwhina i a koe ki te whakautu i ngā pātai.

He tapu tēnei rauemi. E kore taea te tuku atu. Aata tirohia ki ngā kupu kei raro iho i te pouaka nei. E mõhiotia ana te rēwera o Tahimānia mõ tõna whanonga whakatuki. He whanonga **whakaheke** te whakatuki i roto i ngā rēwara o Tahimānia.

Nā te whanonga whakatuki ka whawhai me te ngaungau i a rātou anō, ā, ko te mutunga iho ka taotū, ka mate pea. Nā tēnei whanonga kua tata te korehāhā o te rēwera o Tahimānia.

Te rēwera o Tahimānia http://animals.nationalgeographic.com/animals/ mammals/tasmanian-devil/

(a) Ka taea e te tāupetanga i roto i te tohuāhua te āwhina kia ora tonu. Whakamāramahia he pēhea nei e āwhina ai te tāupetanga i roto i te tohuāhua i te rēwera o Tahimānia kia ora tonu i roto i tōna ake taiao me te ārai atu i te ngaromanga katoatanga o te momo (te noho korehāhā).

I tō whakautu, me:

- tautuhi tēnei mea te tohuāhua
- whakamārama he pēhea nei e āwhina ai te rerekētanga i roto i te tohuāhua i te oranga tonutanga o tētahi kararehe
- whakamārama te take e kaha ake pea te whiwhi oranga tonutanga o taua momo nā te whakatuki ITI IHO o te tohuāhua (arā, ngā rēwera o Tahimānia kāore e whawhai me te ngau).

Tahim <mark>ā</mark> nia i r	oto i ō rātou ake taiao te ōwehenga	i e te oranga tonutanga o ētahi rērewa o a o ngā mea whakatuki ake ki ērā e iti iho te ēnei ki te āraitanga o te korehāhā o taua momo.

#### QUESTION FOUR: THE TASMANIAN DEVIL

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Read the information below to help you answer the questions.

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The Tasmanian devil is known for its aggressive behaviour. Aggressive behaviour is **inherited** in Tasmanian devils.

The aggressive behaviour means that they fight and bite each other leading to injury and possible death. This behaviour has caused Tasmanian devils to become endangered (in danger of dying out).

Tasmanian devil
http://animals.nationalgeographic.com/animals/
mammals/tasmanian-devil/

(a) Variation in phenotype can assist survival. Explain how variation in phenotype may assist the Tasmanian devil to survive in the wild and therefore avoid the species completely dying out (becoming extinct).

In your answer you should:

- define phenotype
- explain how difference in phenotype can aid survival of an individual
- explain why the LESS aggressive phenotype (Tasmanian devils that do not fight and bite) may have a survival advantage for the species.

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population of	the survival of certain can change the ratio of pecies over time AND	aggressive to le	ess aggressive typ	oes of Tasmanian de	

	He puka anō mēnā ka hiahiatia.	
TAU PĀTAI	Tuhia te (ngā) tau pātai mēnā e hāngai ana.	
PATAI		

		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, 2013

# 90948 Demonstrate understanding of biological ideas relating to genetic variation

9.30 am Monday 18 November 2013 Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of biological ideas 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 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 2–23 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.