

See back cover for an English translation of this cover

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90948M



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

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 Ākongā 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

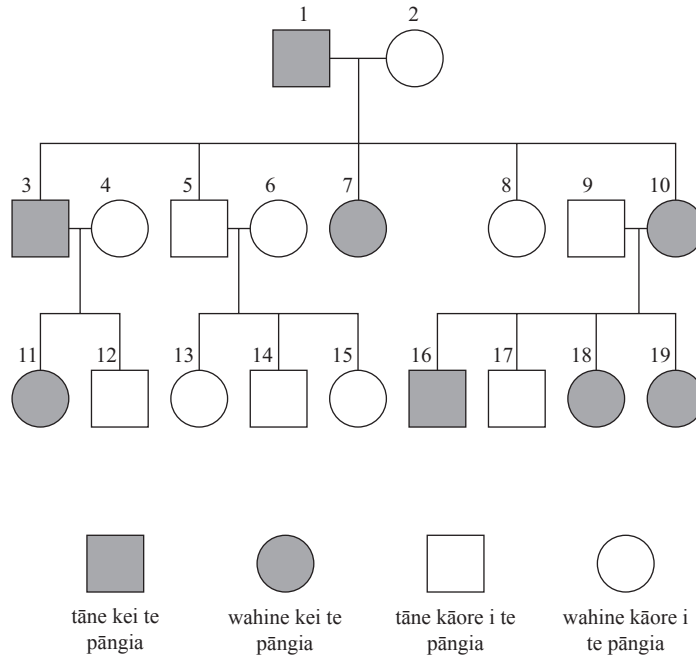
MĀ TE KAIMĀKA ANAKE

Kia 60 meneti hei whakautu i ngā pātai o tēnei pukapuka.

## PĀTAI TUATAHI: NGĀ KĀWAI ME NGĀ TAPAWHĀ PUNNETT

Ko te tahumaero<sup>1</sup> Huntington he tahumaero iranga i roto i te tangata. Ko tētahi irarā ngoi<sup>2</sup> (H) te pūtake. He ngoikore<sup>3</sup> 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:

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- (b) Tuhia te tohuira 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.

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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.

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<sup>1</sup> mate  
<sup>2</sup> tāpua  
<sup>3</sup> huna

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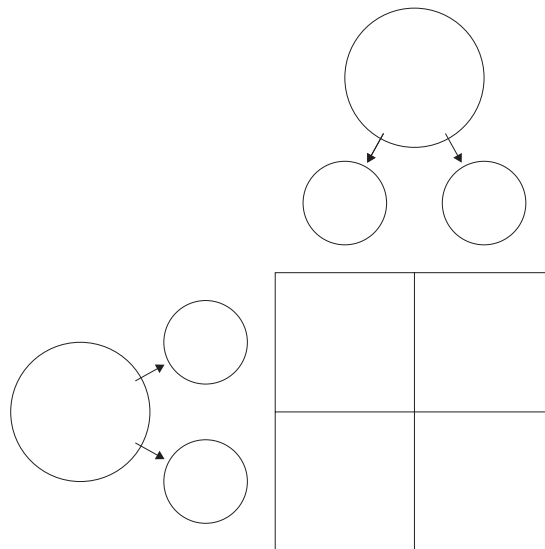


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- (c) Tuhia tētahi tapawhā Punnett hei whakaatu i ngā tohuira o ngā tamariki **ka taea** mai i ngā mātua 9 me te 10.



- (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.

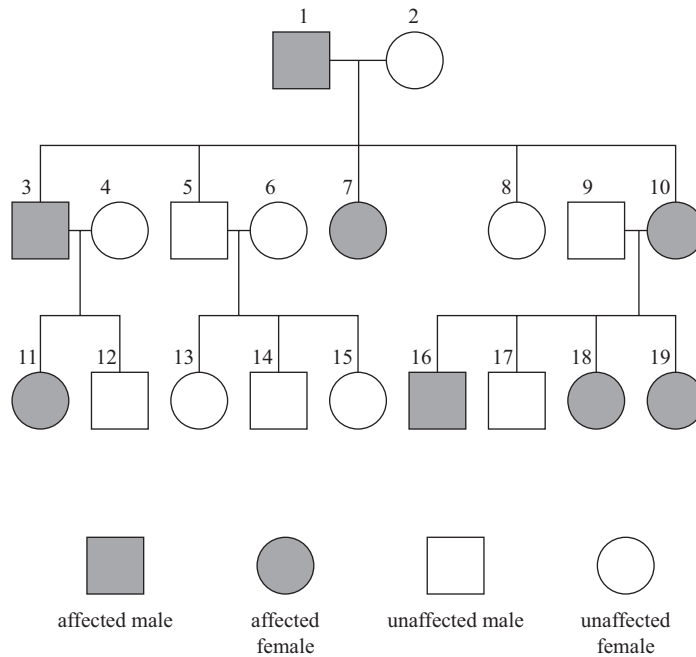
	Tahumaero Huntington : Kāore he tahumaero Huntington
Ōwehenga tohuāhua mai i te tapawhā Punnett	:

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

### 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:

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- (b) State the genotype of individual 9 in the pedigree chart above.

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

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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.

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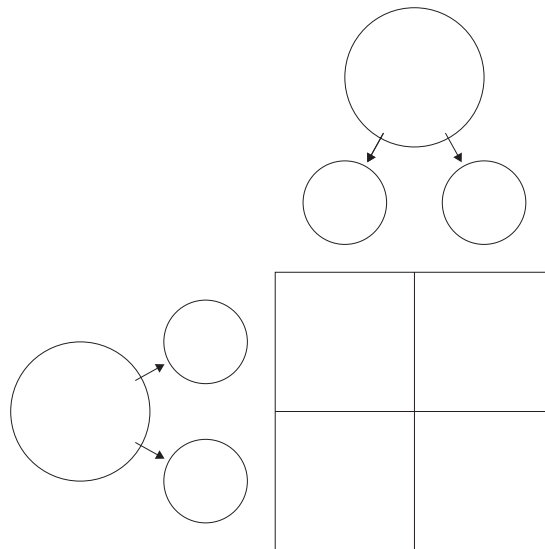


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- (c) Draw a Punnett square to show the **possible** genotypes of the children from parents 9 and 10.



- (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	:









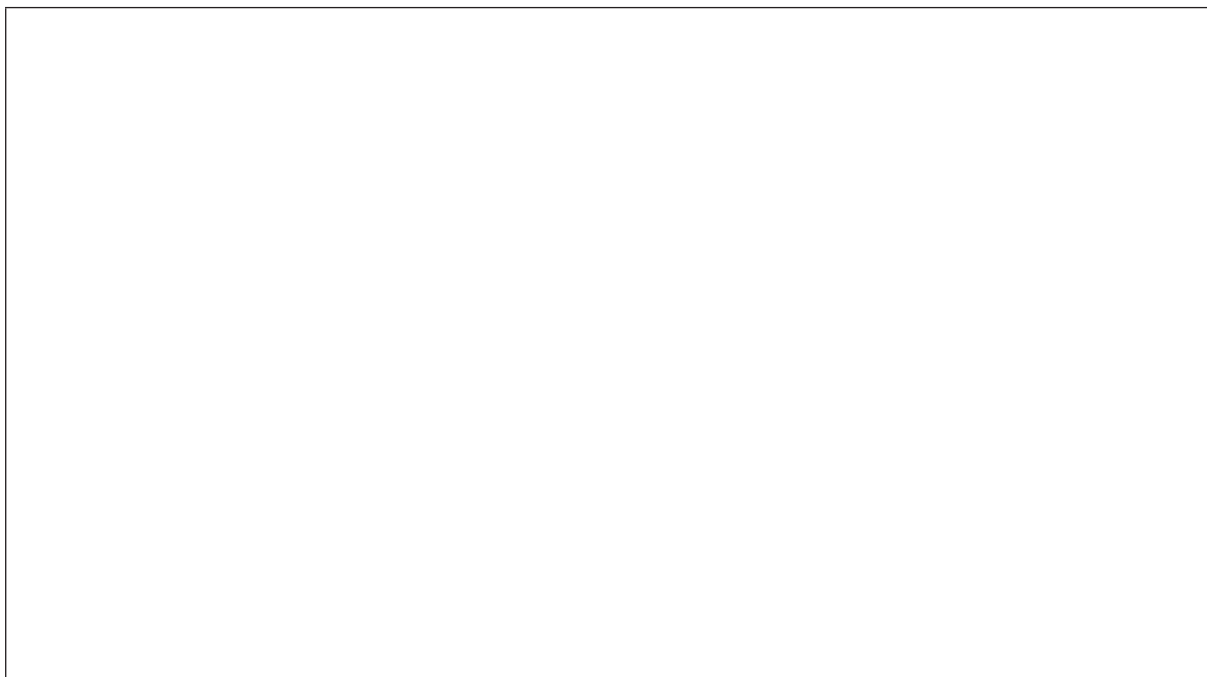


- (b) Ko te irarā mō ngā karu parauri (B) he ngoi ake i te irarā mō ngā karu kikorangi (b) i roto i te tangata.

Matapakitia ka pēhea te whiwhi a tētahi tamaiti i ngā karu kikorangi, ahakoa he parauri ngā karu 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.



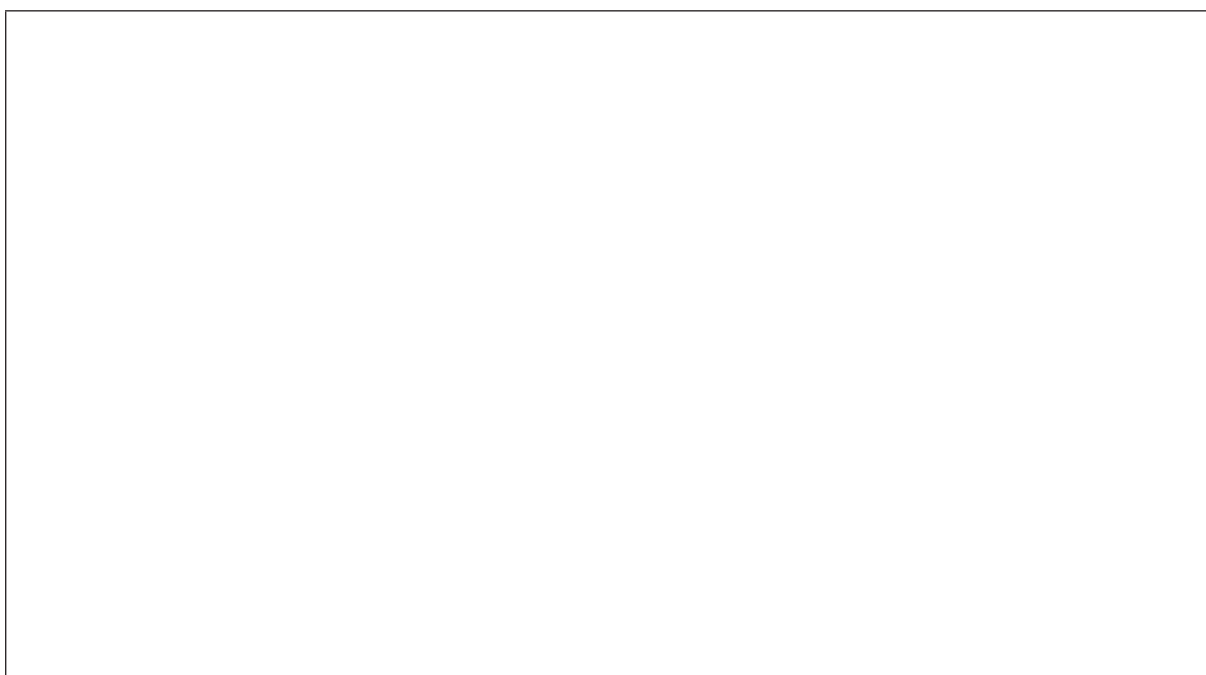


- (b) The allele for brown eyes (B) is dominant over the allele for blue eyes (b) in humans.

Discuss how it would be possible for a child to have blue eyes, even though both their parents have brown eyes.

In your answer you should:

- use labelled Punnett squares
- link the genotypes and phenotypes of the child, parents, AND grandparents.



























*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.**

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