

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, 2011

90948 Te whakaatu māramatanga ki ngā ariā koiora e pā ana ki te tāupetanga¹ iranga

9.30i te ata Rāhina 21 Whiringa-ā-rangi 2011
Whiwhinga: Whā

Paetae	Paetae Kaiaka	Paetae Kairangi
Te whakaatu māramatanga ki ngā ariā koiora e pā ana ki te tāupetanga iranga.	Te whakaatu māramatanga hōhonu ki ngā ariā koiora e pā ana ki te tāupetanga iranga.	Te whakaatu māramatanga matawhānui ki ngā ariā koiora e pā ana ki te tāupetanga iranga.

Tirohia mehemea e ōrite ana te Tau Ākongā ā-Motu kei tō pepa whakauru ki te tau kei runga ake nei.

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

Whakaaturia ngā mahinga KATOĀ.

Ki te hiahia koe ki ētahi atu wāhi hei tuhituhi whakautu, whakamahia te wāhi wātea kei muri i te pukapuka nei.

Tirohia mehemea kei roto nei ngā whārangi 2–21 e raupapa tika ana, ā, kāore hoki he whārangi wātea.

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

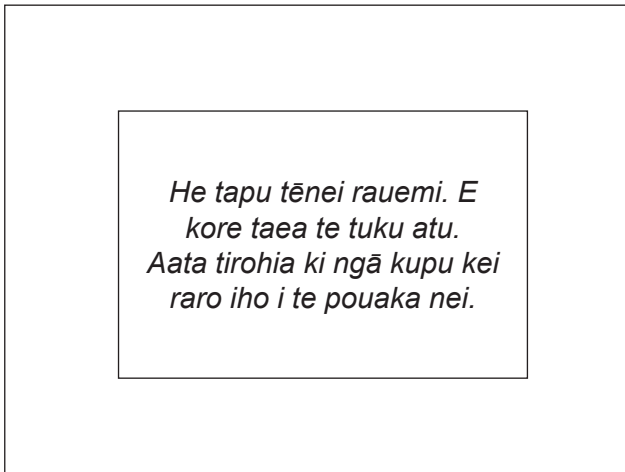
TAPEKE

¹taurangitanga, rerekētanga

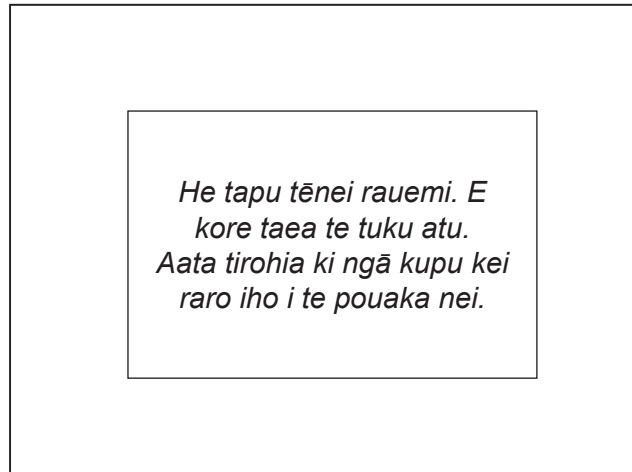
MĀ TE KAIMĀKA ANAKE

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

PĀTAI TUATAHI: NGĀ PAUKENA



<http://myfolia.com/plants/87-patty-pan-squash-cucurbita-pepo-var-clypeata/varieties/6851-early-white-bush-scallop>



http://enjoyindianfood.blogspot.com/2008_10_01_archive.html

Ko tētahi huaira i roto i ngā tipu paukena ko te tae o te hua.

I mā ai te huarākau nā te irarā **ngoi (F)**, ā, ko ngā huarākau kōwhai i pēnei ai nā te irarā **ngoikore (f)**.

(a) Whakamāramatia te **rerekētanga** i waenganui i te ira me te irarā.

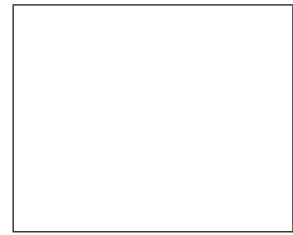
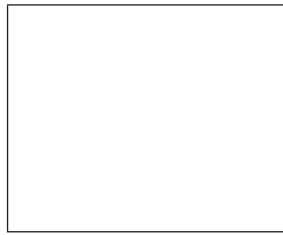
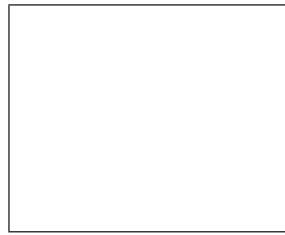
(b) Ka paheko ngā irarā mō te tae o te paukena kia hua ake ko ngā tohuira rerekē E TORU, engari e RUA noa iho ngā tohuāhua.

Whakamāramahia he pēhea te **paheko** o ngā irarā kia hua ko ngā tae paukena e rua **noa iho**, arā, te mā me te kōwhai.

I tō tuhinga me:

- tautuhi i te tohuira **me** te tohuāhua
- tuhia ngā tohuira rerekē e toru i hua ake **me** ia tohuāhua.

Ngā tohuira rerekē
e toru:



Ōna tohuāhua: _____

Ko te tohuira he: _____

Ko te tohuāhua he: _____

E rua noa iho ngā tae o te paukena nā te mea: _____



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

QUESTION ONE: SQUASH PLANTS



<http://myfolia.com/plants/87-patty-pan-squash-cucurbita-pepo-var-clypeata/varieties/6851-early-white-bush-scallop>



http://enjoyindianfood.blogspot.com/2008_10_01_archive.html

One trait in squash plants is the colour of the fruit.

White fruit are due to a **dominant** allele (**F**) and yellow fruit are due to a **recessive** allele (**f**).

- (a) Explain the **difference** between a gene and an allele.

- (b) The alleles for the colour of squash fruit combine to produce **THREE** different genotypes, but only **TWO** phenotypes.

Explain how the alleles **combine** to produce **only** two different squash colours – white and yellow.

In your answer you should:

- define genotype **and** phenotype
- state the three different genotypes produced **and** the phenotype of each.

The three different genotypes:

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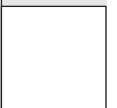
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Their phenotypes: _____

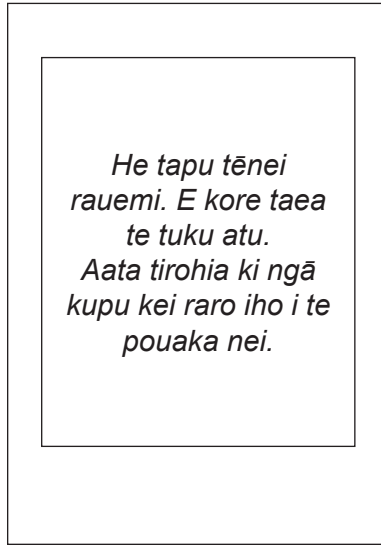
A genotype is: _____

A phenotype is: _____

There are only two different colours of squash fruit because: _____



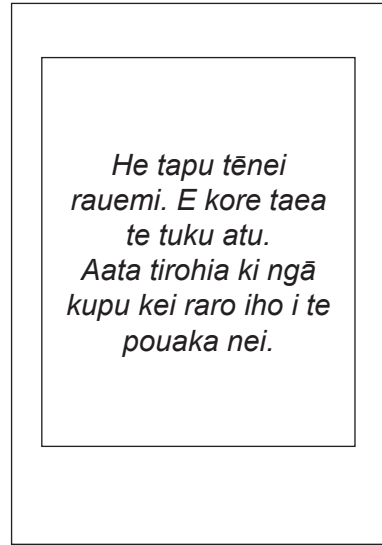
PĀTAI TUARUA: HE ĀHUA MAKIMAKI



*He tapu tēnei
rauemi. E kore taea
te tuku atu.
Aata tirohia ki ngā
kupu kei raro iho i te
pouaka nei.*

Makinui pūnoa

<http://thundafunda.com/33/animals-pictures-nature/candid-western-lowland-gorilla-pictures.php>



*He tapu tēnei
rauemi. E kore taea
te tuku atu.
Aata tirohia ki ngā
kupu kei raro iho i te
pouaka nei.*

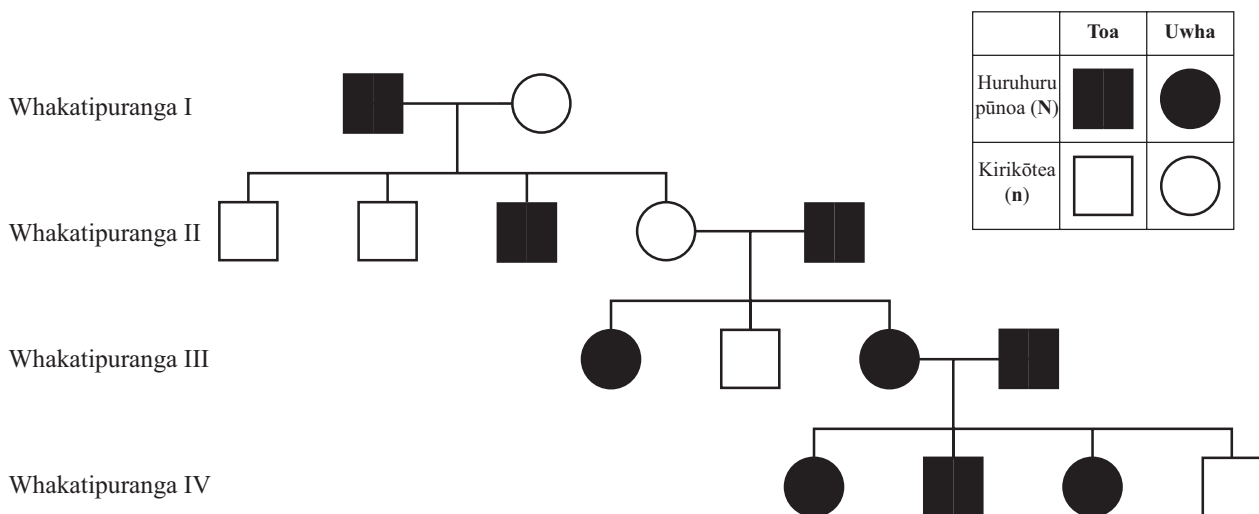
Makinui kirikōtea

<http://s288.photobucket.com/albums/11184/audrey083053/animals/Albino%20Animals/?action=view¤t=albinogorilla.jpg&mediafilter=images>

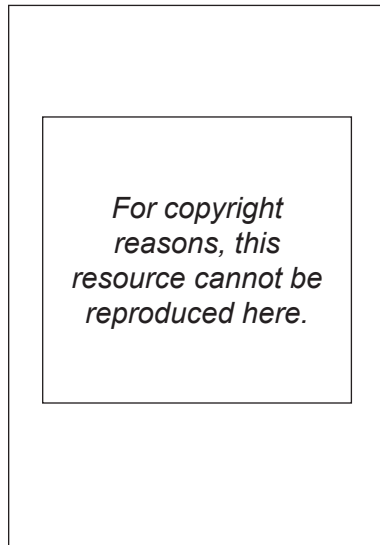
Whakaatu ana ngā makinui i te āhuatanga **ngoikore** tuku iho e kīia ana he kirikōtea. Ka hua ake i tēnei he huruhuru mā.

E whakaatu ana te tūtohi kāwai i raro nei i te tukunga iho o te kirikōtea i roto i tētahi whānau makinui. Ko te huruhuru pūnoa te irarā **ngoi** (N), ā, ko te huruhuru kirikōtea he **ngoikore** (n).

Tūtohi Kāwai



QUESTION TWO: APEING AROUND



Normal gorilla

<http://thundafunda.com/33/animals-pictures-nature/candid-western-lowland-gorilla-pictures.php>



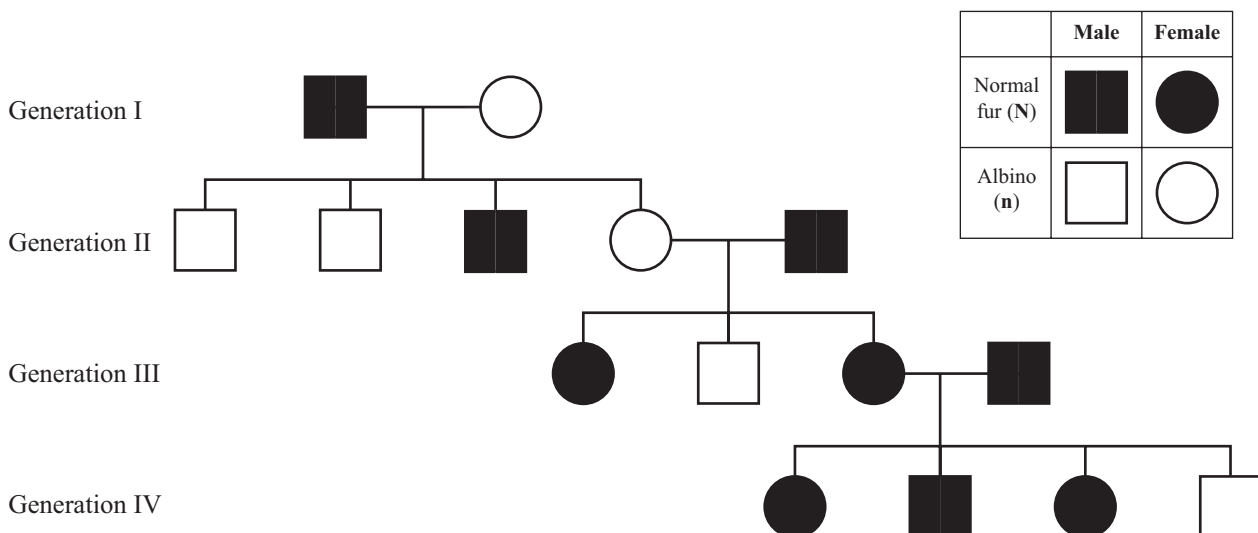
Albino gorilla

<http://s288.photobucket.com/albums/11184/audrey083053/animals/Albino%20Animals/?action=view¤t=albinogorilla.jpg&mediafilter=images>

Gorillas show an inherited **recessive** condition called albinism. This results in white fur.

The pedigree chart below shows the inheritance of albinism in a family of gorillas. Normal fur is the **dominant** allele (N), while albino fur is **recessive** (n).

Pedigree Chart

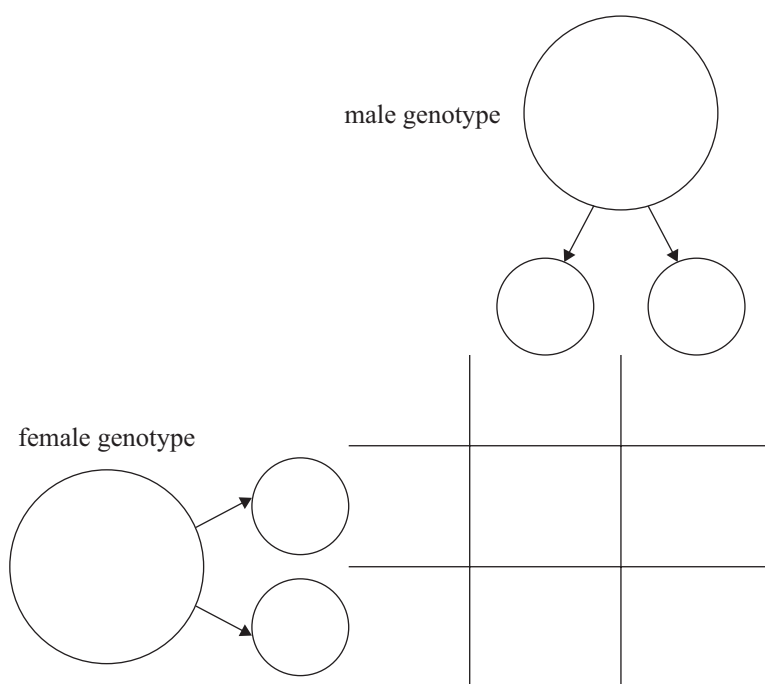


(a) Explain how the pedigree chart can be used to show that albinism is a recessive trait.

In your answer you should:

- define the terms dominant and recessive
- state the genotypes of albino **and** normal gorillas
- complete a labelled Punnett square to support your answer
- explain how your Punnett square shows that albinism is a recessive trait.

Note: Refer to the pedigree chart on page 8.



- (b) Whakamāramahia he aha te tohuira o ngā uri huruhuru **pūnoa** e 3 i te **Whakatipuranga IV** i kore ai e taea te whakatau, i runga i ngā taunakitanga o te tūtohi kāwai me tō tapawhā Punnett mai i te wāhanga (a).

- (b) Explain why the genotype of the 3 **normal** fur offspring in **Generation IV** cannot be determined, based on the evidence in the pedigree chart and your Punnett square from part (a).

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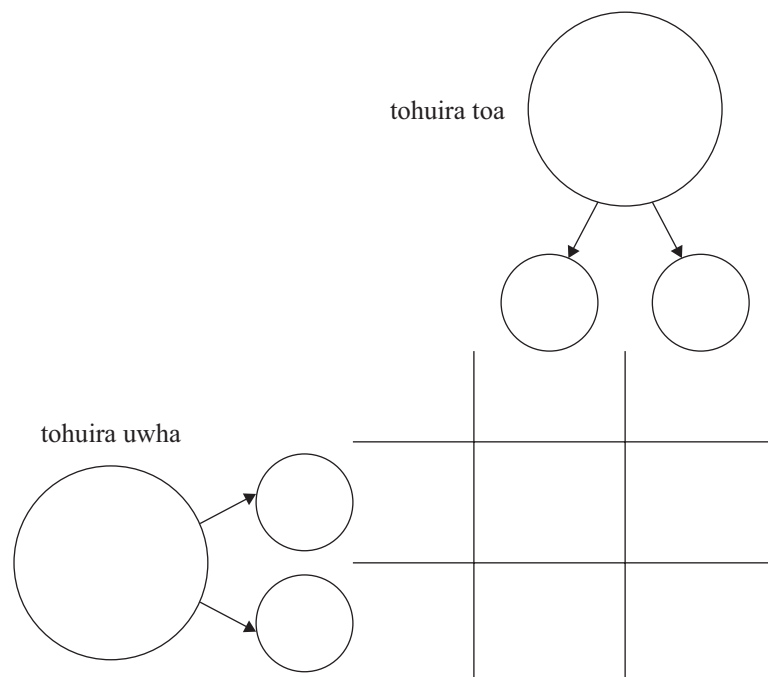
PĀTAI TUATORU: HE KŌTIRO RĀNEI, HE TAMA RĀNEI?

Kei te tātari tētahi tokorua kia whānau tā rāua tamaiti tuatoru. He tamatāne tā rāua me tētahi kōtiro.

(a) Matapakhia te tūponotanga he kōtiro tā rāua tamaiti tuatoru.

I tō tuhinga me:

- whakamārama he pēhea e whakatauhia ai te ira tangata (arā, mēnā ka puta he tama, he kōtiro rānei).
- whakaoti tētahi tapawhā Punnett e whakaatu ana i te tukunga iho o taua ira tangata
- whakamārama te hāngaitanga kua whai tamariki kē te tokorua.



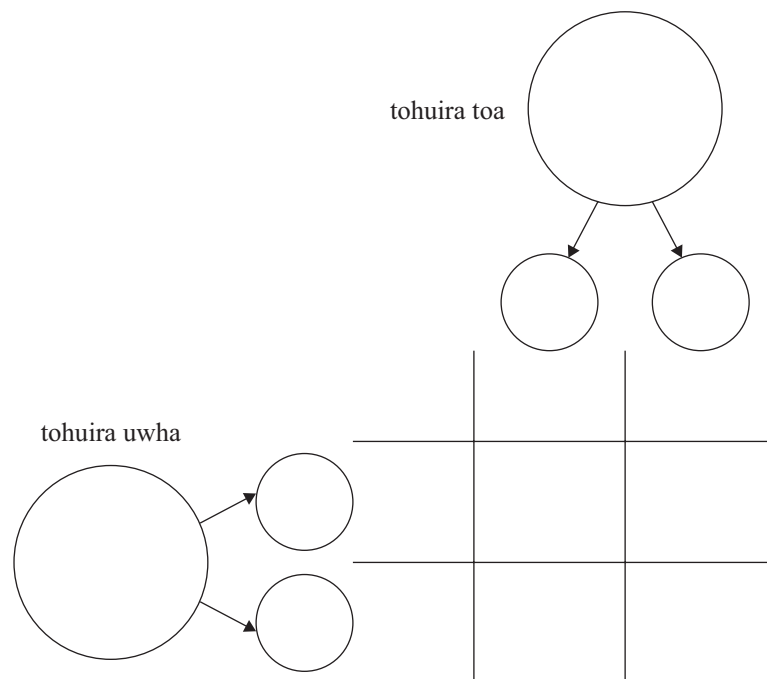
QUESTION THREE: A GIRL OR A BOY?

A couple are expecting their third child. They already have one boy and one girl.

(a) Discuss the likelihood of their third child being a girl.

In your answer you should:

- explain how sex is determined in humans
- complete a Punnett square showing sex inheritance
- explain the relevance of the couple already having children.



- (b) Ko tētahi o ngā mātua he kaiako, ā, nō tērā tau i pā mai te turi ki a ia nā te turituri o ngā akomanga.

Matapikihia te tūponotanga ka **tuku iho tēnei** momo turi ki te pēpi hou.

I tō tuinga me whai whakaaro e koe:

- te pūtaka o te turi o te matua
- he aha ngā momo huaira ka tuku ihotia
- ngā pānga o te iranga me te taiao ki te turi ki ngā uri.

- (b) One of the parents is a teacher who developed deafness last year as a result of having noisy classes.

Discuss the likelihood of **this** type of deafness being **inherited** by the new baby.

In your answer you should consider:

- the reason for the parent’s deafness
- what types of characteristics are inherited
- the effects of genetics and the environment on deafness in offspring.

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PĀTAI TUAWHĀ: TE TĀUPETANGA

He mea hira te tāupetanga ki tētahi taupori.

- (a) Whakamāramahia he aha te tikanga o te kupu **tāupetanga iranga**, me te whakamārama i te hiranga ki tētahi taupori.

QUESTION FOUR: VARIATIONASSESSOR'S
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Genetic variation is important in a population.

- (a) Describe what is meant by the term **genetic variation**, and explain its importance to a population.

(b) Ko tētahi tukanga e hua ake ai tētahi tāupetanga iranga ko te **irakētanga**.

Whakamāramahia he aha ngā irakētanga **me** te whai wāhitanga o ēnei ki te tāupetanga iranga.

I tō tuhinga me matapaki e koe:

- he aha te irakētanga
- ngā pānga o te irakētanga ki ngā ira, ngā irarā me te pītauira
- mēnā ka whakaheke ngā irakē katoa ki te reanga e whai ake.

(b) One process that produces genetic variation is **mutation**.

Explain what mutations are **and** how they contribute to genetic variation.

In your answer you should include:

- what a mutation is
- the effect of mutations on genes, alleles and DNA
- whether all mutations are passed on to the next generation.

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**He wāhi anō mēnā ka hiahiatia.
Tuhia te (ngā) tau pātai mēnā e hāngai ana.**

TAU
PĀTAI

MĀ TE
KAIMĀKA
ANAKE

Extra space if required.
Write the question number(s) if applicable.

QUESTION
NUMBER

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English translation of the wording on the front cover

Level 1 Science, 2011

90948 Demonstrate understanding of biological ideas relating to genetic variation

9.30 am Monday 21 November 2011
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.

Show ALL working.

If you need more room for any answer, use the extra space provided at the back of this booklet.

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.

90948M