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translation of this cover

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91157M



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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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Koiora, Kaupae 2, 2014

91157M Te whakaatu māramatanga ki te rerekētanga ā-ira me te huringa

9.30 i te ata Rāhina 17 Whiringa-ā-rangi 2014
Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki te rerekētanga ā-ira me te huringa.	Te whakaatu māramatanga hōhonu ki te rerekētanga ā-ira me te huringa.	Te whakaatu māramatanga matawhānui ki te rerekētanga ā-ira me te huringa.

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 2–21 e raupapa tika ana, ā, kāore hoki he whārangi wātea.

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

TAPEKE

MĀ TE KAIMĀKA ANAKE

PĀTAI TUATAHI: TUKUNGA IHO PARITO PŪRUA

I roto i ngā paukena me ngā kōahi (*Cucurbita pepo*), ko te tae kiri mā (W) he ngoi ki te tae kiri kōwhai (w) ka mutu ka ngoi te āhua-kōpae (D) ki te āhua-poi (d).

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

http://2.bp.blogspot.com/_Y-QcV-L6Xu4/TN85Q7UVWpI/AAAAAAAAA0U/VrYeexbOOjM/s1600/DSC08347.JPG

Ko ngā ira e whakahaere ana i te tae me te āhua o ngā paukena e noho ana i ngā takirua rerekē o ngā pūira huirua.

Ka whakawhitia te paukena iraruarite mō te tae kiri mā me te āhua kōpae ki tētahi paukena iraruarite mō te tae kiri kōwhai me te āhua porohita. Katoa ngā reanga paukena o muri mai (F1) ka whai i te tohuira¹ ōrite.

(a) Whakaahuahia te **tohuira** o te reanga F1. _____

(b) E rua ēnei paukena F1 ka whakawhitia kia puta ai te reanga F2.

Whakamahia te tūtohi Punnett² hei whakaatu i ngā **tohuhema** me ngā **tohuira** tūmanako katoa o ngā uri F2 katoa ka taea mai.

Ngā tohuhema F1

¹ momoira

² tukutuku

QUESTION ONE: DIHYBRID INHERITANCE

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In pumpkins or squash (*Cucurbita pepo*), white skin colour (W) is dominant to yellow skin colour (w) and disk-shape (D) is dominant to sphere-shape (d).



http://2.bp.blogspot.com/_Y-QcV-L6Xu4/TN85Q7UVWpI/AAAAAAAAA0U/VrYeexbOOjM/s1600/DSC08347.JPG

The genes controlling colour and shape in pumpkins are located on different pairs of homologous chromosomes.

A pumpkin homozygous for white skin colour and disk shape is crossed with a pumpkin homozygous for yellow skin colour and round shape. All the next generation pumpkins (F1) have the same genotype.

- (a) Describe the **genotype** of the F1 generation. _____
- (b) Two of these F1 pumpkins are crossed to produce the F2 generation.

Use the Punnett square to show the **gametes** and all the expected **genotypes** of all the possible F2 offspring.

		F1 gametes			
F1 gametes					

- (c) Homai te **ōwehenga tohuāhua** mō te whakawhiti i oti i te wāhanga (b) ME te whakaahua i te āhua o ia tohuāhua.

- (d) Matapakitia he pēhea te pānga o te whakawhiti atu me ngā ira tūhono i ngā rerekētanga ā-ira i roto i tētahi taupori.

I roto i tō matapakinga:

- whakaahuatia he aha te ira tūhono
- whakaahuatia te tukanga o te whakawhiti atu, tae atu ki te wā ka tūpono
- whakamāramahia te pānga ki ngā ira tūhono o te whakawhiti atu
- whakatauritetia he pēhea te pānga o ngā ira tūhono me te whakawhiti atu ki te rerekētanga ā-ira i roto i tētahi taupori.

Ka āhei koe te tātuhi hoahoa hei tautoko i tō whakautu.

**He wāhi anō mō tō whakautu
ki tēnei pātai kei te whārangi 6.**

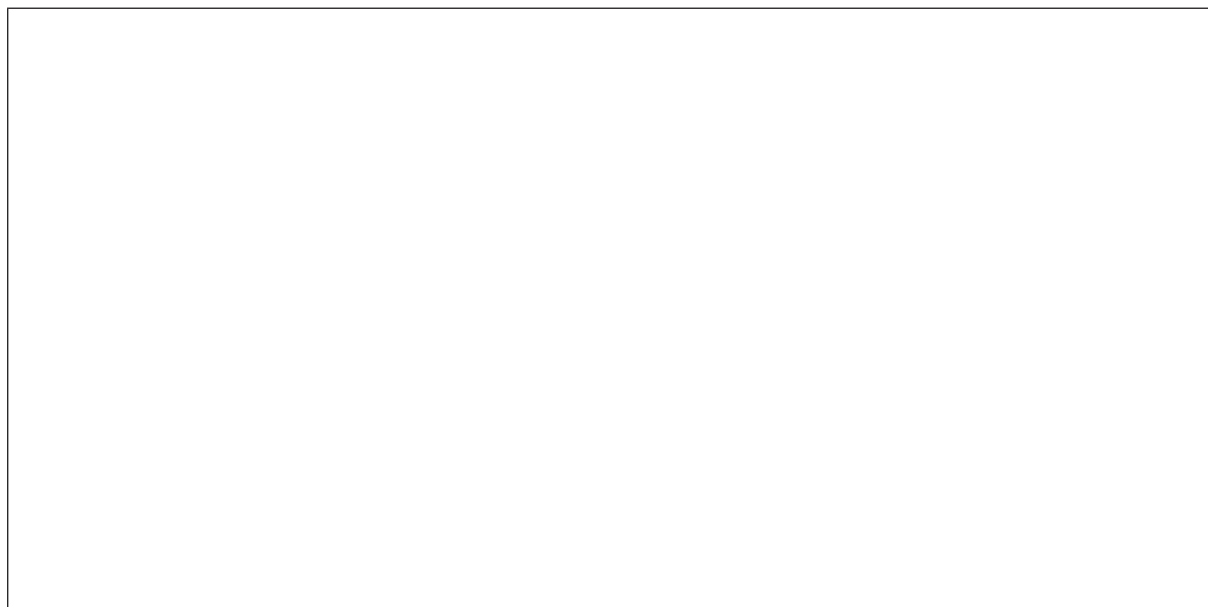
- (c) Give the **phenotype ratio** for the cross completed in part (b) AND describe the appearance of each phenotype.

- (d) Discuss how crossing over and linked genes affect genetic variation in a population.

In your discussion:

- describe what linked genes are
- describe the process of crossing over, including when it occurs
- explain the effect of crossing over on linked genes
- compare and contrast how both linked genes, and crossing over, affect genetic variation in a population.

You may draw diagrams to support your answer.



There is more space for your answer to this question on page 7.

PĀTAI TUARUA: NGĀ IRARĀ³ HOU

Ka taea ngā paukena te tipu i te kōwao. Ko te tikanga he porohita ngā paukena kōwao ka mutu he kākano kei waenganui. I te mea kei waenganui ngā kākano, ina ngaua e ngā kararehe he nui te tūponotanga ka kainga ngā kākano, ā, ka horahia.

Nā ngā irakētanga ka taea te puta o ngā paukena pea te āhua i ētahi wā. Kei tētahi pito kotahi anake ngā kākano o ngā paukena pea te āhua.

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

www.greenpatchseeds.com.au/vegetables2.html

- (a) Tautuhia te kupu irakētanga.

- (b) Ka puta ngā paukena pea te āhua i te irakētanga tohuhema.

Whakamāramahia mai te tukanga o te irakētanga tohuhema, ka mutu he aha tēnei, ā, āhea ka pā mai.

³ āhuaira

QUESTION TWO: NEW ALLELESASSESSOR'S
USE ONLY

Pumpkins can grow in the wild. Wild pumpkins are usually round and have seeds in the centre. With the seeds being in the centre, when animals take a bite there is a high chance of seeds being eaten and then distributed.

Mutations can occasionally cause pear-shaped pumpkins to form. Pear-shaped pumpkins have seeds at only one end.

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www.greenpatchseeds.com.au/vegetables2.html

- (a) Define the term mutation.

- (b) Gametic mutation leads to pear-shaped pumpkins.

Explain the process of gametic mutation including what it is, and where it occurs.

Mātapakitia he aha te irarā mō te paukena pea te āhua i kore ai e whai wāhi atu ki te puna ira kōwao.

- whakaahuatia he aha te puna ira
- whakamāramahia te tukanga whiringa māori
- whakamāramahia he pēhea te whakaawe o te whiringa māori i ngā auautanga irarā i roto i tētahi puna ira
- matapakitia he aha te irarā mō te paukena pea te āhua i kore ai e whai wāhi ki roto i te puna ira kōwao mā te whiringa māori.

**He wāhi anō mō tō whakautu ki
tēnei pātai kei te whārangi 12.**

Discuss why the allele for pear-shaped pumpkin has not become established in the wild gene pool.

- describe what a gene pool is
- explain the process of natural selection
- explain how natural selection influences allele frequencies in a gene pool
- discuss why the pear-shaped pumpkin allele has not become established in the wild gene pool through natural selection.

There is more space for your answer to this question on page 13.

Ko te inanga kauaeroa tāpotupotu (*Galaxias cobitinis*) te ika wai māori onge rawa o Aotearoa. E noho taratahi mai ana i ētahi atu momo inanga mō ngā miriona tau, ā, e kitea anake ināianei i roto i tētahi ono kiromita o te Awa o Kauru, i Te Raki o Ōtākou.

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

Inanga kauaeroa tāpotupotu.

www.niwa.co.nz/freshwater-and-estuaries/nzffd/NIWA-fish-atlas/fish-species/lowland longjaw galaxias

Matapakitia he pēhea te pānga mai o te rerekē o tētahi puna ira me te auautanga irarā i ngā taupori taratahi pēnei i te inanga kauaeroa tāpotupotu nā te terenga iranga me te hekenga.

Ki tō whakautu:

- whakaahuahia ngā kupu terenga iranga, hekenga, me te auautanga irarā
- whakamāramahia he pēhea te pānga o ngā rerekētanga ki te auautanga irarā nā te terenga iranga me te hekenga
- matapakitia he pēhea te pānga o te terenga iranga me te hekenga ki te taupori iti o te inanga kauaeroa tāpotupotu, tēnā ki te momo inanga taupori nui atu.

**He wāhi anō mō tō whakautu ki
tēnei pātai kei te whārangi 16.**

QUESTION THREE: CHANGES IN A GENE POOLASSESSOR'S
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The lowland longjaw galaxias (*Galaxias cobitinis*) is New Zealand's rarest freshwater fish. It has been isolated from other galaxias species for millions of years and now is found only in a six kilometre stretch of the Kauru River, in North Otago.

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Lowland longjaw galaxias.

[hwww.niwa.co.nz/freshwater-and-estuaries/nzffd/NIWA-fish-atlas/fish-species/lowland_longjaw_galaxias](http://www.niwa.co.nz/freshwater-and-estuaries/nzffd/NIWA-fish-atlas/fish-species/lowland_longjaw_galaxias)

A change in allele frequency in a population can result in a new species forming from an ancestor species.

Discuss how genetic drift and migration can contribute to a change in gene pool and allele frequency in isolated populations, such as the lowland longjaw galaxias.

In your answer:

- describe the terms genetic drift, migration, and allele frequency
- explain how genetic drift and migration cause changes in allele frequencies
- discuss how genetic drift and migration affect the lowland longjaw galaxias's small population compared to a galaxias species with a larger population.

**There is more space for your
answer to this question on page 17.**

He puka anō mēnā ka hiahiatia.
Tuhia te (ngā) tāu pātai mēnā e hāngai ana.

TAU PĀTAI

MĀ TE
KAIMĀKA
ANAKE

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

QUESTION
NUMBER

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He puka anō mēnā ka hiahiatia.
Tuhia te (ngā) tāu pātai mēnā e hāngai ana.

TAU PĀTAI

MĀ TE
KAIMĀKA
ANAKE

Extra paper 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 2 Biology, 2014

91157 Demonstrate understanding of genetic variation and change

9.30 am Monday 17 November 2014
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of genetic variation and change.	Demonstrate in-depth understanding of genetic variation and change.	Demonstrate comprehensive understanding of genetic variation and change.

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.

TOTAL

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