90948M

909485

NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

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Pūtaiao, Kaupae 1, 2019

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

9.30 i te ata Rāpare 14 Whiringa-ā-rangi 2019
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.

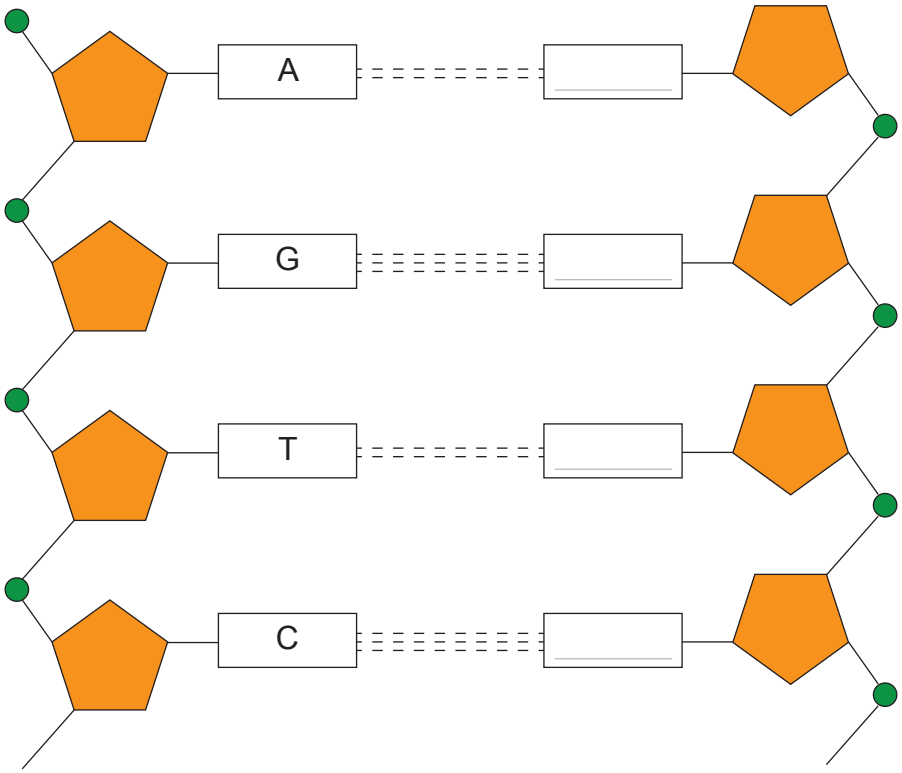
TAPEKE

MĀ TE KAIMĀKA ANAKE

TŪMAHI TUATAHI: TE HANGANGA PĪTAUIRA

MĀ TE KAIMĀKA ANAKE

(a) Tapaina ngā pāpāhua kore tapanga A, G, T, C rānei i roto i te hoahoa pītauira e whakaaturia ana i raro nei.



He mea urutau mai i: http://cronodon.com/BioTech/Cell_Nucleus.html

Ka taea e ētahi pakeke te nakunaku miraka, engari ko te nuinga ko te 65% kāore e taea. E āhei ana te pakeke ki te nakunaku miraka nā tētahi irakē ā-pītauira.

(b) He aha tēnei mea te irakē?

QUESTION ONE: DNA STRUCTURE

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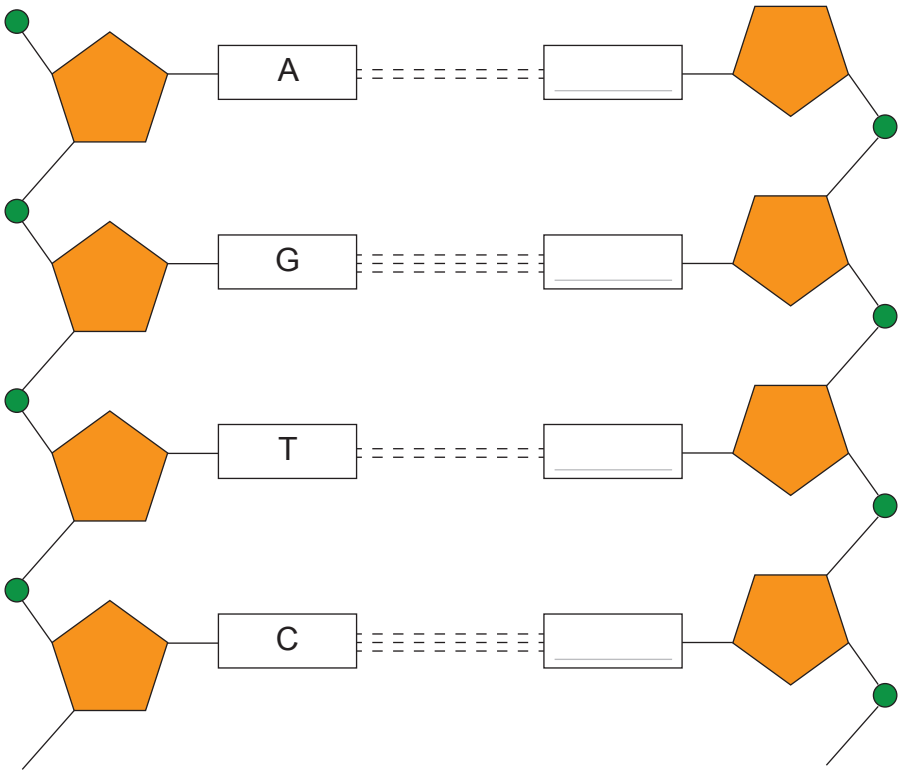
(a) Label the blank bases A, G, T or C in the diagram of DNA shown below.



Adapted from: http://cronodon.com/BioTech/Cell_Nucleus.html

Some adults can digest milk, but the majority 65% cannot. The ability to digest milk as an adult is caused by a DNA mutation.

(b) What is a mutation?

(c) Whakamāramahia mai he pēhea te whai kaha te pakeke ki te nakunaku miraka nā tētahi irakē. Me whakauru ki tō tuhinga ngā kupu **pītauira**, **ira**, **irarā**, **tohuāhua** me te **irakē**.

MĀ TE KAIMĀKA ANAKE

(d) Whakamāramahia mai he pēhea te tuku iho i tētahi irakē ki te reanga o muri mai.

(c) Explain how a mutation can give adults the ability to digest milk.

You should include the terms **DNA**, **gene**, **allele**, **phenotype**, and **mutation**.

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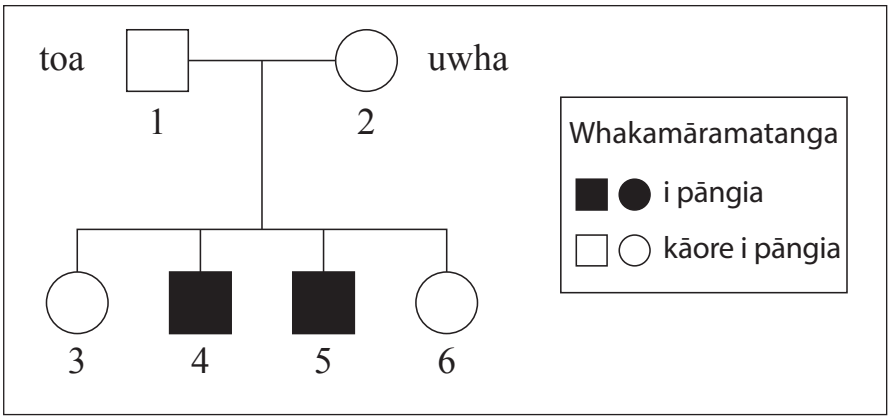
(d) Explain how a mutation can be passed on to the next generation.

TŪMAHI TUARUA: TE MATE HŪWARE TĀPIAPIA

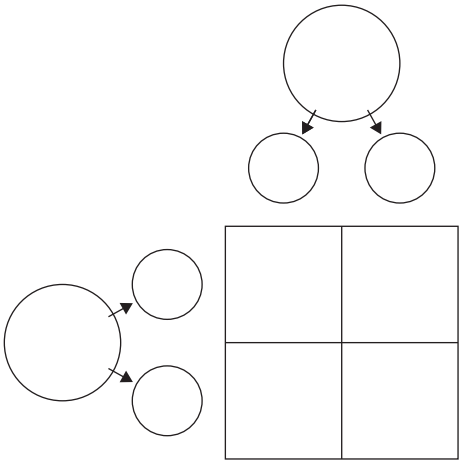
MĀ TE KAIMĀKA ANAKE

He mate whakaheke ā-ira te mate hūware tāpiapia. Ka kitea i roto i tētahi whānau, e ai ki te tūtohi kāwai i raro. He ira huna te irarā (t) o te mate hūware tāpiapia ki te irarā (T) kāore i pāngia.

Kāwai tauira – mate hūware tāpiapia



(a) Whakaotihia te tapawhā Punnett mō te whakawhiti i waenga i te tangata 1 me tangata 2.



(b) Whiriwhiria ngā tohuira o ngā tāngata e toru e whai ake.

Tangata 1: _____ Tangata 2: _____ Tangata 5: _____

QUESTION TWO: CYSTIC FIBROSIS

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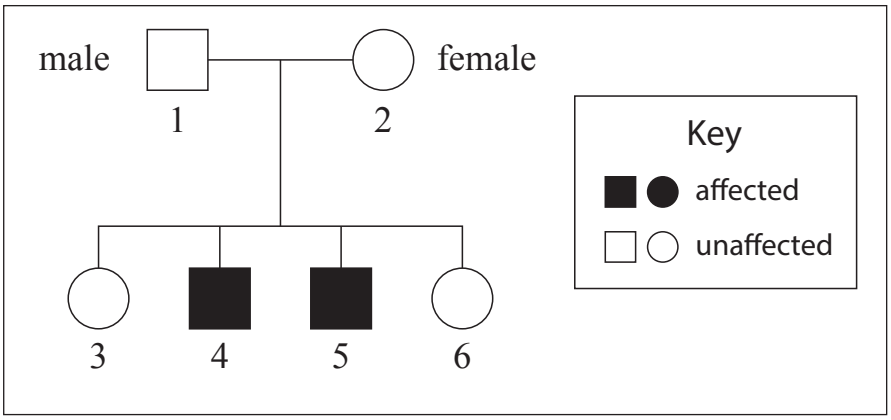
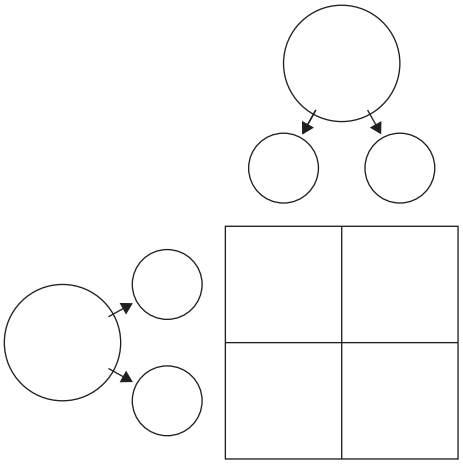
Cystic fibrosis is a genetically inherited condition. It can be traced through a family, as shown in the pedigree chart. The cystic fibrosis allele (t) is recessive to the unaffected allele (T).

Sample pedigree – cystic fibrosis



(a) Complete the Punnett square for the cross between individual 1 with individual 2.



(b) Work out the genotypes of the following three individuals.

Individual 1: _____ Individual 2: _____ Individual 5: _____

(c) Whakamāramahia mai ngā rerekētanga i roto i te ōwehenga tohuāhua i tūmanakohia o ngā uri ki te ōwehenga tohuāhua tūturu o ngā uri i waenga i te whakawhiti me te tangata 1 me te tangata 2.

I tō tuhinga me kōrero koe mō ngā ōwehenga tohuāhua i tūmanakohia me te mea tūturu mō te whakawhiti.

MĀ TE KAIMĀKA ANAKE

Ōwehenga tohuāhua tūmanako: _____ Ōwehenga tohuāhua tūturu: _____

(c) Explain any difference in the expected phenotypes of the offspring ratio to the actual phenotypes of the offspring ratio between the cross with individual 1 and individual 2.

In your answer you should refer to the expected and actual phenotype ratios for the cross.

Expected phenotype ratio: _____ Actual phenotype ratio: _____

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TŪMAHI TUATORU: TE WHAKAPUTA URI TŌRUA ME TE ORANGA TONUTANGA

MĀ TE KAIMĀKA ANAKE

www.radionz.co.nz/national/programmes/insight/audio/2018623809/insight-kauri-dieback-can-these-noble-trees-be-protected

Ka whakakinotia e te tahumaero mate kauri (kauri dieback) ngā kikonga e kawe ana i ngā taiora i roto i te rākau kauri. Ko te tikanga o tēnei ka ora ētahi rākau, ā, ka mate ētahi i te hia kai.

(a) Whakaahuahia mai te rerekētanga ā-ira i roto i ngā kauri.

(b) Whakamāramahia mai he pēhea te pā mai o te rerekētanga ā-ira i te whakaputa uri tōrua a ngā kauri, Ā, he pēhea te pikitanga o te oranga tonutanga o te momo nā tēnei, mēnā e hōrapa ana te mate kauri.

Ki tō tuhinga, me whai whakaaro ki:

- ngā tukanga o te hanganga pūtau hema (arā, te whāiti pūira) me te whakatōnga
- te taurangitanga o te taupori mā te whakaputa uri tōrua
- te hono i waenga i te rerekētanga ā-ira me te oranga tonutanga o te kauri hei momo.

He wāhi anō mō tō tuhinga mō tēnei tūmahi kei te whārangi 12.

QUESTION THREE: SEXUAL REPRODUCTION AND SURVIVAL

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www.radionz.co.nz/national/programmes/insight/audio/2018623809/insight-kauri-dieback-can-these-noble-trees-be-protected

The kauri dieback disease damages the tissues that carry nutrients within the kauri tree. This means some trees survive and others starve to death.

(a) Describe genetic variation in kauri trees.

(b) Explain how the sexual reproduction of kauri trees causes genetic variation AND how this could lead to increased survival of the species when faced with kauri dieback disease.

In your answer you should consider:

- the processes of gamete formation (meiosis) and fertilisation
- how sexual reproduction leads to variation in the population
- the link between genetic variation and the survival of kauri trees as a species.

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

MĀ TE KAIMĀKA ANAKE

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He whārangi anō ki te hiahiatia.
Tuhia te (ngā) tau tūmahi mēnā e tika ana.

TAU TŪMAHI

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 1 Science, 2019

90948 Demonstrate understanding of biological ideas relating to genetic variation

9.30 a.m. Thursday 14 November 2019
Credits: Four

90948M

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 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.