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90927M



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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

SUPERVISOR'S USE ONLY

Koiora, Kaupae 1, 2017

90927M Te whakaatu māramatanga ki ngā ariā koiora e pā ana ki te moroiti

9.30 i te ata Rāpare 16 Whiringa-ā-rangi 2017
Whiwhinga: Whā

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

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 mō ō tuhinga, whakamahia te (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.

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

TAPEKE

MĀ TE KAIMĀKA ANAKE

TŪMAHI TUATAHI: TE WHAKANAO ME TE WHAKAPUTU KAI – MIRAKA TEPE¹

Ko tētahi tikanga o te tohu miraka ko te whakamoī. Ka mahia te miraka tepe mā te whakamoī miraka, mā te whakamahi huakita pērā i te *Lactobacillus* hei whakaputa waikawa waiū. Nā te pikitanga o te waikawa ka huri te tāwara me te kakano o te miraka, kia puta ko te miraka tepe.

Ka whai tahi a Lucas rāua ko Sarah i ngā mahi i raro hei mahi miraka tepe.

Ngā tohutohu o te mahi miraka tepe:

- Whakawerahia kia 200 mL miraka ki te 80°C.
- Whakamātaohia te miraka ki te 30°C.
- Tāpirihia te 50 mL o te miraka tepe kua whai huakita *Lactobacillus*, ka āta kōrori haere.
- Waiho ki tētahi wāhi mahana mō te 8 haora.

I muri i te waru haora ka tirohia e rāua te miraka tepe, ka kite kua mātotoru me te mā te āhua, pērā i te miraka tepe o te toa. Kātahi ka raua e Sarah tāna miraka tepe ki roto i tētahi ipu katihau i te pouaka whakamātao. I waiho e Lucas tāna ki te papakai.

I tō rāua hokinga mai i tahirā, i kite a Lucas i ngā hekaheka e tipu ana i tana miraka tepe, ā, i te mata tonu te āhua o tā Sarah, ka mutu kāore he hekaheka i te tipu.



Te miraka tepe a Lucas me te tipu hekaheka.

www.ehow.co.uk/info-tip_7984683_dangerous-eat-moldy-yogurt.html



Te miraka tepe a Sarah.

Matapakitia he pēhea te tuku a ngā tukanga ora o ngā moroiti i ngā huakita kia whakamahia hei mahi miraka tepe, ā, he pēhea te whakarite a ngā tukanga ora o ngā moroiti me pēhea tā tātau putu kai kia mata ai.

I tō tuhinga, me:

- whakaahua i te tukanga o te whakamoī ka puta i ngā huakita pēnei i te *Lactobacillus*
- whakaahua i ngā āhuetanga taiao e hiahiatia ana mō te tipu o te huakita (*Lactobacillus*) i roto i te miraka tepe
- whakamārama mai he aha i taea ai te mahi kai pērā i ngā miraka tepe e te whakamahinga o ngā tukanga ora o ngā huakita
- matapaki i te hiranga o te putu i te miraka tepe kua mahia ki roto i tētahi ipu katihau ki te pouaka whakamātao kia noho mata ai.

¹ waipupuru

QUESTION ONE: FOOD PRODUCTION AND STORAGE – YOGHURT

One way to preserve milk is by fermentation. Yoghurt is made by fermenting milk, using bacteria such as *Lactobacillus* that produce lactic acid. The increase in acidity changes the flavour and texture of the milk, making yoghurt.

Lucas and Sarah each followed the steps below to make yoghurt.

Yoghurt making instructions:

- Heat 200 mL of milk to 80°C.
- Cool the milk to 30°C.
- Add 50 mL of yoghurt that contains *Lactobacillus* bacteria and stir gently.
- Leave in a warm place for 8 hours.

After eight hours they checked the yoghurt, and noticed that it looked thick and white, just like store-bought yoghurt. Sarah then put hers in an airtight container in the fridge. Lucas left his on the bench.

When they came back two days later, Lucas noticed that there were fungi growing on his yoghurt, and that Sarah's still looked fresh and did not have fungi growing on it.



Lucas's yoghurt
with fungal growth.

www.ehow.co.uk/info-tip_7984683_dangerous-eat-moldy-yogurt.html



Sarah's yoghurt.

Discuss how the life processes of microbes allow bacteria to be used to make yoghurt, and how the life processes of microbes determine how we need to store food to keep it fresh.

In your answer:

- describe the process of fermentation that occurs in bacteria such as *Lactobacillus*
- describe the environmental factors required for the growth of the bacteria (*Lactobacillus*) in the yoghurt
- explain how the life processes of bacteria allow them to be used in making foods like yoghurt
- discuss the importance of storing the finished yoghurt in an airtight container in the fridge to keep it fresh.

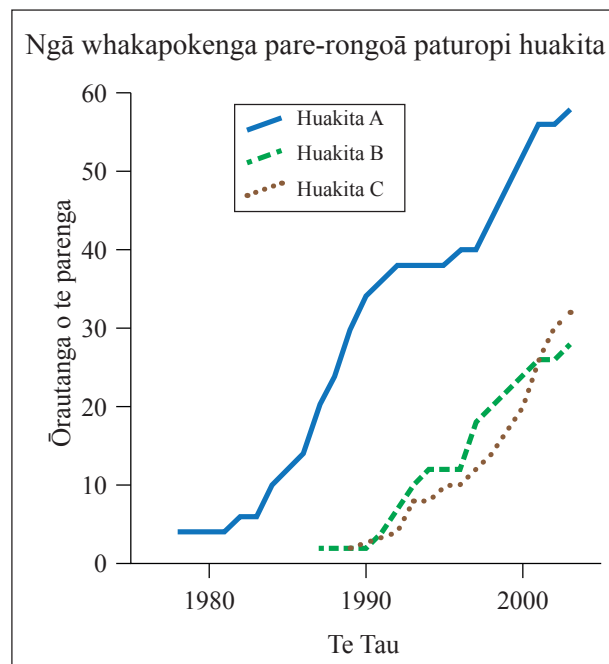
TŪMAHI TUARUA: NGĀ RONGOĀ PATUROPI, NGĀ HUAKITA, ME NGĀ HUAKETO

Kua whakaitia e ngā rongoā paturopi te maha o ngā matenga nā ngā whakapokenga huakita puta noa i te ao. Ka taea e ngā rongoā paturopi ngā huakita te patu, engari kāore he take ki ngā huaketo.

(a) Tātuhia he hoahoa tapanga o tētahi huaketo me tētahi huakita.

Hoahoa o tētahi huaketo	Hoahoa o tētahi huakita

(b) I ēnei tau kua hipa, e noho parenga ana ētahi huakita tukumate ki ngā rongoā paturopi.



www.futuretimeline.net/blog/2013/04/25-2.htm#.WDTxXaJ968o

Matapakitia te whakamahinga o ngā rongoā paturopi hei whakamaimoa whakapokenga huakita.

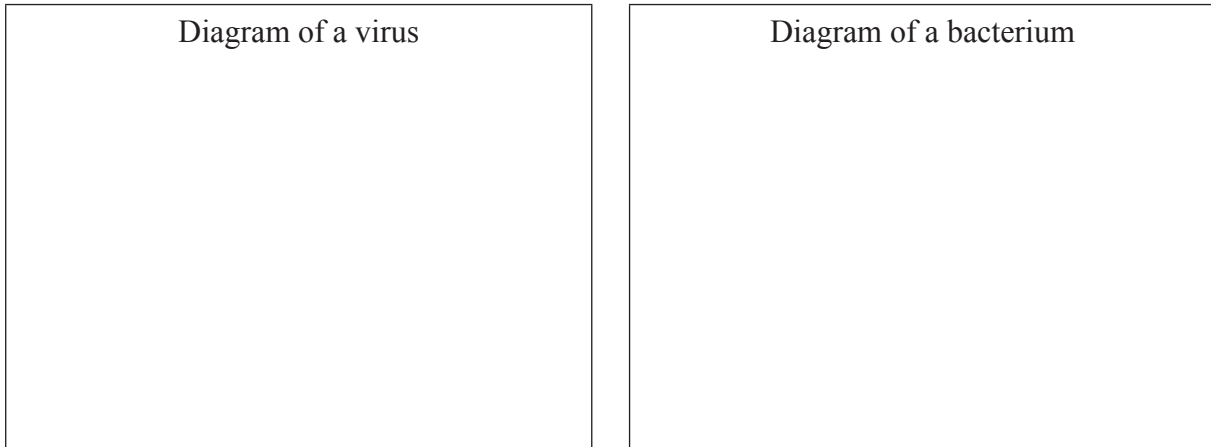
I tō tuhinga, me:

- whakaahua i te ia i roto i te ōrau o ngā parenga rongoā paturopi e ai ki te kauwhata
- whakamārama i ngā pānga o ngā rongoā paturopi ki ngā tukanga ora o te huakita
- whakamārama he aha i taea ai ngā whakapokenga huakita te whakamaimoa mā ngā rongoā paturopi, engari anō ngā whakapokenga huaketo
- matapaki he pēhea te whanake mai o te parenga rongoā paturopi i ngā taupori huakita, ā, me pēhea te whakaiti.

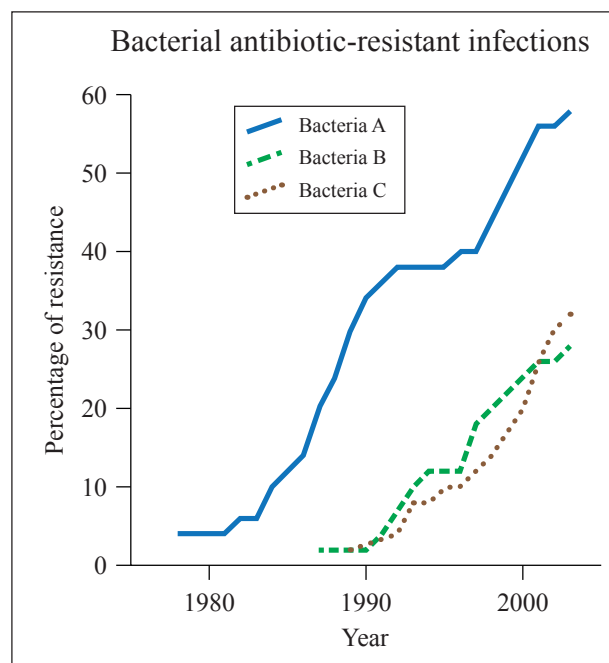
QUESTION TWO: ANTIBIOTICS, BACTERIA, AND VIRUSES

The use of antibiotics has reduced the number of deaths due to bacterial infections around the world. Antibiotics can kill bacteria, but are not effective against viruses.

- (a) Draw a labelled diagram of a virus and a bacterium.



- (b) In recent years, some pathogenic bacteria have become resistant to antibiotics.



www.futuretimeline.net/blog/2013/04/25-2.htm#.WDTxXaJ968o

Discuss the use of antibiotics to treat bacterial infections.

In your answer:

- describe the trend in the percentage of antibiotic resistance shown in the graph
- explain the effects of antibiotics on the life processes of bacteria
- explain why bacterial infections can be treated with antibiotics, while viral infections cannot
- discuss how antibiotic resistance in bacterial populations can develop, and how it can be reduced.

TŪMAHI TUATORU: PŪHEKAHEKA AWE

Tipu noa te pūhekaheka awe i ngā rākau tawai i Aotearoa. He kai i ngā wē mīere, he matū pūngao nui ka mahia e ngā ngāngara kei ngā rākau anō e noho ana.



He pūhekaheka awe e tipu ana i te kōhiwi o tētahi rākau tawai.

www.sciencelearn.org.nz/images/1738-sooty-mould

Weuweu² pūhekaheka awe e tirohia ana e te karu whārahi.

www.researchgate.net/publication/264275370_The_sooty_moulds

Ko tētahi take taiao e whakaawe ana i te tipu o te pūhekaheka awe ko te takawai³ (te nui o te wai kei te hau). I kohia e tētahi ākongā ētahi raraunga hei tūhura i te pānga o te takawai ki te tipu o te pūhekaheka awe. Kei te tūtohi i raro ana hua e whakaaturia ana:

Takawai (nui o te wai i te hau)	Ōrau kapi o te pūhekaheka awe kei ngā rākau tawai
Takawai teitei	90% te toharite o ngā kōhiwi i kapi
Takawai wawaenga	50% te toharite o ngā kōhiwi i kapi
Takawai pāpaku	20% te toharite o ngā kōhiwi i kapi

Matapakitia he pēhea te mahi tahi a ngā take taiao, tukanga ora me te hanganga me te mahi a tētahi pūhekaheka pēnei i te pūhekaheka awe kia pai ai tana tipu i ngā rākau tawai o Aotearoa.

I tō tuhinga, me:

- whakaahua i te hanganga me te mahi a tētahi hekaheka pēnei i te pūhekaheka awe
- whakamārama i ngā take taiao e hiahia ana kia pai ai te tipu o tētahi hekaheka pērā i te pūhekaheka awe
- whakamārama he pēhea te kai, te tipu me te whakaputa uri a tētahi hekaheka pērā i te pūhekaheka awe
- matapaki he pēhea e whakaawetia ai ngā tukanga ora o ngā pūhekaheka awe e te takawai me ētahi atu take taiao pērā i te paemahana, te wātea o te hāora, ngā matūkai, te wai me te whakataetae.

² wekeweke

³ pīpīwai

QUESTION THREE: SOOTY MOULD

Sooty mould is a common fungus that grows on beech/tawai trees in New Zealand. It feeds on honeydew, which is an energy-rich substance made by insects that also live on the trees.



Sooty mould growing on the trunk of a beech/
tawai tree.

www.sciencelearn.org.nz/images/1738-sooty-mould

Sooty mould hyphae as seen under a microscope.

www.researchgate.net/publication/264275370_The_sooty_moulds

One environmental factor that affects the growth of sooty mould is humidity (amount of water in the air). A student collected some data to investigate the effect of humidity on sooty mould growth. Her results are in the table below:

Humidity (amount of water in the air)	Percentage cover of sooty mould on beech/tawai trees
High humidity	Average of 90% of trunks covered
Medium humidity	Average of 50% of trunks covered
Low humidity	Average of 20% of trunks covered

Discuss how environmental factors, life processes and the structure and function of a fungus such as sooty mould, work together to allow it to live successfully on New Zealand's beech/tawai trees.

In your answer:

- describe the structure and function of a fungus such as sooty mould
- explain the environmental factors required for a fungus such as sooty mould to live successfully
- explain how a fungus such as sooty mould feeds, grows, and reproduces
- discuss how the life processes of sooty mould are affected by humidity and other environmental factors such as temperature, oxygen availability, nutrients, moisture and competition.

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English translation of the wording on the front cover

Level 1 Biology, 2017

90927 Demonstrate understanding of biological ideas relating to micro-organisms

9.30 a.m. Thursday 16 November 2017
Credits: Four

90927M

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of biological ideas relating to micro-organisms.	Demonstrate in-depth understanding of biological ideas relating to micro-organisms.	Demonstrate comprehensive understanding of biological ideas relating to micro-organisms.

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 2–15 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.