91606M

916065

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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

3

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Koiora, Kaupae 3, 2016

91606M Te whakaatu māramatanga ki ngā ia i roto i te kunenga tangata

2.00 i te ahiahi Rāpare 10 Whiringa-ā-rangi 2016
Whiwhinga: Whā

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki ngā ia i roto i te kunenga tangata.	Te whakaatu māramatanga hōhonu ki ngā ia i roto i te kunenga tangata.	Te whakaatu māramatanga matawhānui ki ngā ia i roto i te kunenga tangata.

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 2–23 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

© Mana Tohu Mātauranga o Aotearoa, 2016. Pūmau te mana.
Kia kaua rawa he wāhi o tēnei tuhinga e whakahuatia ki te kore te whakaaetanga tuatahi a te Mana Tohu Mātauranga o Aotearoa.

TŪMAHI TUATAHI

He mea taketake te tuhi i ngā ōritetanga me ngā rerekētanga i waenga i ngā momo hominiti (Hominid) kia mārama ai ki ō rātou hononga koiora me te kunenga[1]. E whakaatu ana ngā angaanga A me B i ētahi ōritetanga, rerekētanga hoki. E whakaae ana ngā kaimātai tikanga tangata he tawhito ake te Angaanga A i te Angaanga B.

Angaanga A

https://blogopithecus.files.wordpress.com/2009/03/tcahd-3d-reconstruction.jpg

Angaanga B

www.sideshowtoy.com/mas_assets/jpg/KAM05_press01-001.jpg

www.anthrophoto.com/cgi-bin/ImageFolio31//imageFolio.cgi?search=under&img=&cat=&bool=phrase

www.sideshowtoy.com/mas_assets/jpg/KAM05_press02-001.jpg

http://www.dlt.ncssm.edu/tiger/360views/Hominid_Skull-Homo_erectus_PekingMan_1200x900/top-bottom/Hominid_Skull-Homo_erectus_PekingMan-top-900.jp

[1] kukuwhatanga

QUESTION ONE

Documenting similarities and differences between Hominid species is fundamental to understanding their biological and evolutionary relationships. The skulls A and B show some similarities and differences. Anthropologists have agreed that Skull A is older than Skull B.

Skull A

https://blogopithecus.files.wordpress.com/2009/03/tcahd-3d-reconstruction.jpg

Skull B

www.sideshowtoy.com/mas_assets/jpg/KAM05_press01-001.jpg

www.anthrophoto.com/cgi-bin/ImageFolio31//imageFolio.cgi?search=under&img=&cat=&bool=phrase

www.sideshowtoy.com/mas_assets/jpg/KAM05_press02-001.jpg

http://www.dlt.ncssm.edu/tiger/360views/Hominid_Skull-Homo_erectus_PekingMan_1200x900/top-bottom/Hominid_Skull-Homo_erectus_PekingMan-top-900.jp

MĀ TE KAIMĀKA ANAKE

Matapakitia ngā pānga whiriwhiri ka tautoko i ngā huringa kunenga ka kitea i te Angaanga B tēnā i te Angaanga A.

I tō matapakinga:

- whakaahuahia mai kia WHĀ ngā āhuatanga e tautoko ana he tawhito ake te Angaanga A i te Angaanga B
- whakamāramahia mai he pēhea te tūhono i ēnei āhuatanga i tautuhia ki ngā taunakitanga o te noho waerua, me ngā kai hoki i kai ēnei hominiti
- matapakihia i pēhea te puta i ēnei huringa ki ngā āhuatanga angaanga ngā ia kunenga ki te noho waerua, te kai, me te mōhio o ngā hominiti.

He wāhi anō mō tō tuhinga mō tēnei tūmahi kei te whārangi 6.

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Discuss the selective forces which would support the evolutionary changes observed in Skull B compared to Skull A.

In your discussion:

- describe FOUR features that support Skull A being older than Skull B
- explain how these identified features can be linked to evidence of bipedalism, and to the types of food these hominids ate
- discuss how the changes in the skull features have led to evolutionary trends in bipedalism, diet, and intelligence of hominids.

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

MĀ TE KAIMĀKA ANAKE

He wāhi anō mō tō tuhinga mō tēnei tūmahi kei te whārangi 8.

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There is more space for your answer to this question on page 9.

MĀ TE KAIMĀKA ANAKE

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TŪMAHI TUARUA

He rerekē te whanake mai o ngā momo kunenga ahurea o ngā *Homo habilis*, *Homo erectus*, me ngā *Homo neanderthalensis* kia ora ai rātou i roto i tō rātou ake tūranga hauropi. E whakaaturia ana ētahi o aua momo kunenga ahurea i roto i ngā pikitia i raro.

Homo habilis
http://earlyman.yolasite.com/homo-habilis.php

Homo neanderthalensis
http://ies.aquiscelenis.climantica.org/2012/02/20/homo-neanderthalensis/
http://hoopermuseum.earthsci.carleton.ca/neanderthal/neanderthal.jpg

Homo erectus
www.erasmatazz.com/library/science/the-phylogeny-of-play.html
www.flashofgold.com/14-events-that-changed-military-history/

Tātarihia ngā āhuatanga rerekē o te kunenga ahurea.

I tō tātaritanga:

- whakatauhia he aha te kunenga ahurea
- whakamāramahia ngā momo rerekē o te kunenga ahurea e pā ana ki ngā *Homo habilis*, *Homo erectus*, me ngā *Homo neanderthalensis*
- whakamāramahia mai i pēhea te puta o ēnei momo kunenga ahurea rerekē hei huapai urutau mō ngā momo i whakamahi i ēnei
- matapakitia ngā huapai me ngā huakino kua pā ki te kunenga koiora nā te kunenga ahurea.

QUESTION TWO

Homo habilis, *Homo erectus*, and *Homo neanderthalensis* have developed different forms of cultural evolution to help them survive successfully in their ecological niche. Some of these forms of cultural evolution are shown in the pictures below.

Homo habilis
http://earlyman.yolasite.com/homo-habilis.php

Homo neanderthalensis
http://ies.aquiscelenis.climantica.org/2012/02/20/homo-neanderthalensis/

http://hoopermuseum.earthsci.carleton.ca/neanderthal/neanderthal.jpg

Homo erectus
www.erasmatazz.com/library/science/the-phylogeny-of-play.html

www.flashofgold.com/14-events-that-changed-military-history/

Analyse the different aspects of cultural evolution.

In your analysis:

- define cultural evolution
- describe the different forms of cultural evolution associated with *Homo habilis*, *Homo erectus*, and *Homo neanderthalensis*
- explain how these different forms of cultural evolution are adaptive advantages for the species who use them
- discuss the advantages and disadvantages that cultural evolution has had on biological evolution.

MĀ TE KAIMĀKA ANAKE

He wāhi anō mō tō tuhinga mō tēnei tūmahi kei te whārangi 14.

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There is more space for your answer to this question on page 15.

MĀ TE KAIMĀKA ANAKE

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TŪMAHI TUATORU

I tīmata ngā tāngata te neke mai i Āwherika i ngā tau tata ki te 100 000 ki mua. E whakaatu ana te Mahere 1 i raro nei i ngā ara hekenga i whāia e aua tāngata.

I te wā i neke haere ngā tāngata i Uropi me Āhia kāore i kore i tūtaki rātou ki ngā tāngata onamata, pēnei i ngā Neanderthal i Uropi me ngā Denisovan i Āhia (Mahere 2).

I tātaria e ngā kaimātai pūtaiao ngā raraunga iranga o ngā tāngata neke atu i te 1 500 mai i te ao katoa, me te whakarite i whakaputa uri ngā tipuna taketake o ngā tāngata onāianei rātou ko ngā Neanderthal ko ngā Denisovan.

I ēnei rā, ko te āhuatanga iranga o te nuinga o ngā tāngata i whānau mai i waho o Āwherika ki te tonga o te Sahara he 1 ki te 4 ōrau he Neanderthal rātou. I moata anō te wehe mai o ngā Denisovan i Āwherika, ā, pērā anō i ō rātou uri ngā Neanderthal, i whakaputa uri rātou ko ngā *Homo sapiens*.

He iranga EPAS1 rerekē tō ngā tāngata Tepete e taea e rātou te noho i te wāhi hāora pāpaku me te whai pūtau toto whero tokoiti ake i te nuinga o tātou. Ka noho rahirahi me te hauora o rātou toto i te 4.8 kiromita te teitei. Ka taea tēnei ira te whai ki ngā Denisovan rā anō; i tiri i tēnei ira ki ngā tāngata e noho ana i Tepete i ēnei rā.

He ira te HLA e āwhina ana i ngā pūtau toto mā ki te patu i ngā kaiurutomo moroiti ki ō tātou tinana. E whakapono ana ngā kairangahau me mihi ngā tāngata e kawe ana i tēnei ira ki ngā Neanderthal me ngā Denisovan nā te mea i urutau kē ēnei tāngata onamata ki ngā whakapokenga me ngā tahumaero i pā i waho o Āwherika.

Mahere 1. Ngā Ara Hekenga o ngā *Homo sapiens*

He mea urutau mai i: Anna Roberts rāua ko Maria Sinclair. *Level 3 Biology Study Guide*, Putanga Tuatoru. ESA Study Guide

Mahere 2. Ara Hekenga me ngā Rohe o te Whakaputa Uri Whakawhiti

http://www.nature.com/nrg/journal/v12/n9/fig_tab/nrg3029_F4.html#figure-title-history/

Matapakitia ngā huapai me ngā huakino o te whai i ngā ara hekenga rerekē, me ngā pānga ka taea ki te kunenga ahurea me te kunenga koiora.

I tō matapakinga:

- whakaahuahia ngā take mō te marara atu ki ētahi atu rohe, me te tautuhi i ngā painga ka riro mai i te mararatanga
- whakamāramahia mai te āhua o te whakaawe o ngā huringa o te taiao ki ngā ara hekenga i whakamahia
- whakamāramahia mai te āhua o te tautoko a ngā taunakitanga tātari mtDNA me te pītauira i te tauira marara 'i waho i Āwherika'
- matapakitia he pēhea te āwhina a te whakaputa uri whakawhiti (te whakaputa uri o ngā taupori e rua i noho taratahi i mua) ki te mararatanga.

QUESTION THREE

Modern humans began to migrate out of Africa around 100 000 years ago. Map 1 below shows the migration paths that modern humans took.

As humans moved through Europe and Asia they would have met these earlier hominins, like the Neanderthals in Europe and Denisovans in Asia (Map 2).

Scientists analysed the genetic information of more than 1 500 people from all around the world, and determined that ancestors of modern humans interbred (admixture) with Neanderthals and Denisovans.

Today, the genetic makeup of most people born outside Sub-Saharan Africa is 1 to 4 percent Neanderthal. The Denisovans also left Africa early, and like their Neanderthal relatives, they interbred with *Homo sapiens*.

The Tibetan people have a variant of the EPAS1 gene that allows them to deal with low oxygen with fewer red blood cells than the rest of us. Their blood stays thin and healthy 4.8 kilometres up. This gene can be traced back to the Denisovans; they shared this gene with people who now live in Tibet.

HLA is a gene that helps white blood cells destroy micro-organism intruders in our bodies. Researchers believe people carrying this gene can thank Neanderthals and Denisovans for it, as these hominins had already adapted to infections and diseases found outside Africa.

Map 1. Migration Routes of *Homo sapiens*

Adapted from: Sinclair, Anna Roberts & M. *Level 3 Biology Study Guide*, 3rd Edition. ESA Study Guide

Map 2. Migration Route and Regions of Admixture

http://www.nature.com/nrg/journal/v12/n9/fig_tab/nrg3029_F4.html#figure-title-history/

Discuss the advantages and disadvantages of taking the various migration routes, and the possible effects that this has had on cultural and biological evolution.

In your discussion:

- describe the reasons for dispersal to other regions, and identify the benefits gained from the dispersal
- explain how changes in the environment could have influenced the migration routes used
- explain how the evidence of mtDNA and DNA analysis support the 'out of Africa' dispersal model
- discuss how admixture (interbreeding of two previously isolated populations) could have helped with dispersal.

MĀ TE KAIMĀKA ANAKE

He wāhi anō mō tō tuhinga mō tēnei tūmahi kei te whārangi 20.

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There is more space for your answer to this question on page 21.

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 3 Biology, 2016

91606 Demonstrate understanding of trends in human evolution

2.00 p.m. Thursday 10 November 2016
Credits: Four

91606M

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of trends in human evolution.	Demonstrate in-depth understanding of trends in human evolution.	Demonstrate comprehensive understanding of trends in human evolution.

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 2–23 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.