

# 3

91606M



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 3, 2017

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

9.30 i te ata Rāpare 16 Whiringa-ā-rangi 2017  
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 mō ō tuhinga, whakamahia ngā whārangi wātea kei muri o tēnei pukapuka, ka āta tohu ai i ngā 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

He tino hira te kunenga<sup>1</sup> koiora o te ringa i roto i te kunenga o te tangata onamata. Kei raro ko ngā ringa o te *Ardipithecus ramidus* me te *Homo neanderthalensis*. E kaha ana te hono o ngā huringa ki te kunenga o te ringa ki ngā huringa i te taiao.

*Ardipithecus ramidus*

*Homo neanderthalensis*



Kōnui me te  
kōroa

Whakakopa kaha  
me te tika

<http://scienceblogs.com/laelaps/2009/10/02/will-the-earliest-known-homini/>  
<http://science.sciencemag.org/content/326/5949/70.full>

<https://iphesnews.wordpress.com/2015/06/30/why-did-neanderthals-use-the-teeth-as-a-third-hand/>  
[http://pubpages.unh.edu/~jel/images/Neanderthal\\_grip.jpg](http://pubpages.unh.edu/~jel/images/Neanderthal_grip.jpg)  
<http://kids.britannica.com/students/assembly/view/202300>

Tātarihia ngā ia kunenga e whakaaturia ana i roto i ngā ringa i runga, ME TE matapakinā ngā huringa i te taiao me te waeruatanga, ka puta ēnei huringa kunenga.

I tō tuhinga, me:

- whakaahua ētahi ia kunenga e rua i roto i te hanganga o ngā ringa e whakaaturia ana i runga
- whakamārama mai he pēhea ngā huringa ki te taiao i whakaputaina ai pea i ngā huringa i tautohua e koe
- matapaki i ngā painga urutau ka tukuna e ngā huringa i roto i te ringa me te waeruatanga.

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**He wāhi anō mō tō tuhinga  
mō tēnei tūmahi kei ngā  
whārangi 4 me 5.**

<sup>1</sup> kukuwhatanga

**QUESTION ONE**

Biological evolution of the hand has been important in hominin evolution. Below are the hands of *Ardipithecus ramidus* and *Homo neanderthalensis*. Changes in the evolution of the hand are strongly linked to changes in the environment.

*Ardipithecus ramidus**Homo neanderthalensis*

Thumb and  
index finger

Power and  
precision grip

<http://scienceblogs.com/laelaps/2009/10/02/will-the-earliest-known-homini/>

<http://science.sciencemag.org/content/326/5949/70.full>

<https://iphesnews.wordpress.com/2015/06/30/why-did-neanderthals-use-the-teeth-as-a-third-hand/>

[http://pubpages.unh.edu/~jel/images/Neanderthal\\_grip.jpg](http://pubpages.unh.edu/~jel/images/Neanderthal_grip.jpg)

<http://kids.britannica.com/students/assembly/view/202300>

Analyse the evolutionary trends displayed in the hands shown above, AND discuss how changes in the environment and bipedalism would lead to these evolutionary changes.

In your answer:

- describe two evolutionary trends in the structure of the hands shown above
- explain how changes in the environment are likely to have led to the changes you have identified
- discuss the adaptive advantages that changes in the hand and bipedalism could have provided.

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**There is more space for your answer to this question on pages 4 and 5.**



Lined area for writing, consisting of 23 horizontal lines.



## TŪMAHI TUARUA

Toki aronui Oldowan

[www.aggsbach.de/wp-content/uploads/2014/07/fighcehd.jpg](http://www.aggsbach.de/wp-content/uploads/2014/07/fighcehd.jpg)

Toki  
Acheulean  
ā-ringa

<https://nz.pinterest.com/pin79376012161481249/>

Toki Neolithic

<https://chw3m1.wikispaces.com/Neolithic+Types+of+Tools+or+Weapons+Materials+and+Use?responseTocken=e872917f8c94da9e00d062639f33374>

Ahi

<http://wonderopolis.org/wonder/how-was-fire-discovered>

Awa whakawhānau o ngā tāngata onamata i tīpakohia

[https://aspergerhuman.files.wordpress.com/2014/10/800px-homo\\_erectus\\_pelvis21.jpg](https://aspergerhuman.files.wordpress.com/2014/10/800px-homo_erectus_pelvis21.jpg)

Kītanga toharite o te angaanga i ngā tāngata onamata i tīpakohia

<http://fhs-bio-wiki.pbworks.com/w/page/24003004/Hominid%20evolution>

He pānga tō te anga whakamua o te kunenga ahurea pērā i te whanaketanga o ngā kākahu, utauta, reo, me te whakamahi i te ahi ki te kunenga koiora.

Whakamārama mai he pēhea te pānga o te kunenga ahurea ki te kunenga koiora, Ā, ka parahau i te pānga o tēnei ki ngā ia kunenga o te angaanga me te papatoiake.

I tō tuhinga, me:

- whakaahua i te rerekētanga i waenga i te kunenga ahurea me te kunenga koiora
- whakaahua i ngā ia i te kunenga ahurea me te kunenga koiora o te angaanga me te papatoiake, ka whakamārama i ngā pēhanga whiringa e puta ai ēnei huringa ahurea
- parahau he pēhea te pānga o te kunenga ahurea ki te kunenga koiora o te angaanga me te papatoiake.

**He wāhi anō mō tō tuhinga  
mō tēnei tūmahi kei ngā  
whārangi 8 me 9.**

## QUESTION TWO

ASSESSOR'S  
USE ONLY

## Oldowan chopper

[www.aggsbach.de/wp-content/uploads/2014/07/fighcehd.jpg](http://www.aggsbach.de/wp-content/uploads/2014/07/fighcehd.jpg)

Acheulean  
hand axe

<https://nz.pinterest.com/pin79376012161481249/>

## Neolithic axe

<https://chw3m1.wikispaces.com/Neolithic+Types+of+Tools+or+Weapons+Materials+and+Use?responseToken=e872917f8c94dc9e00d062639f33374>

## Fire

<http://wonderopolis.org/wonder/how-was-fire-discovered>

## Birthing canal of selected hominins

[https://aspergerhuman.files.wordpress.com/2014/10/800px-homo\\_erectus\\_pelvis21.jpg](https://aspergerhuman.files.wordpress.com/2014/10/800px-homo_erectus_pelvis21.jpg)

Average size of cranial capacity in  
selected hominins

<http://fhs-bio-wiki.pbworks.com/w/page/24003004/Hominid%20evolution>

The advancement in cultural evolution such as the development of clothing, tools, language, and the use of fire has had an effect on biological evolution.

Explain how cultural evolution can affect biological evolution, AND justify the effect this had on the evolutionary trends of the skull and pelvis.

In your answer:

- describe the difference between cultural and biological evolution
- describe the trends in cultural evolution and biological evolution of the skull and pelvis, and explain the selective pressures that could lead to these cultural changes
- justify how cultural evolution has affected biological evolution of the skull and pelvis.

**There is more space for your answer to this question on pages 8 and 9.**



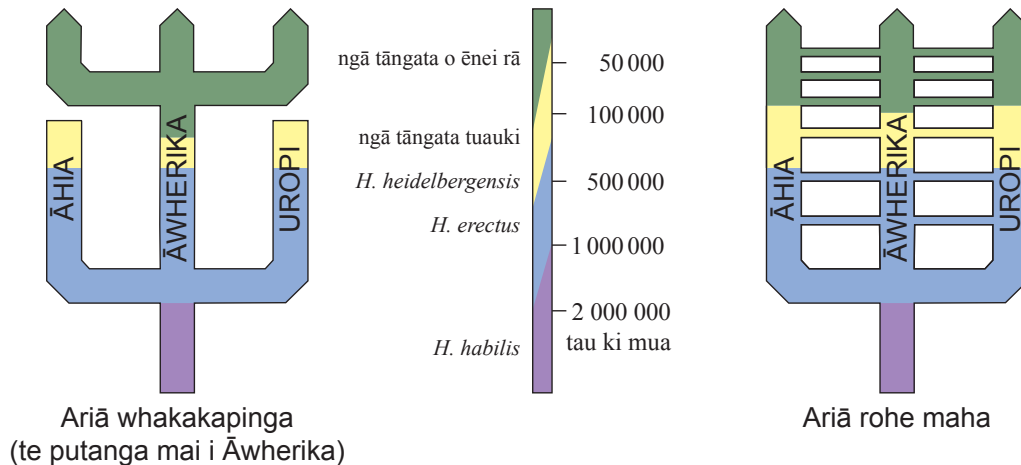




## TŪMAHI TUATORU

He nui ngā taupatupatu e pā ana ki te āhua o te mararatanga o ngā tāngata o ēnei rā ki te ao whānui. I te kitenga haere anō o ngā parawae, me te tango i ngā pūtauirā me te tātari, kua huri ngā whakaaro mō te marara o te tangata i ēnei tau kua hipa nei. Ko ngā tino ariā e rua e whāia whānuitia ana ko te ariā rohemaha me te ariā whakakapinga (ariā o te putanga mai i Āwherika).

He maha ngā puna whakaaturanga hei tautoko i ia ariā, pērā i ngā tātāritanga pūtauirā, tātāritanga mtDNA, me te hanganga parawae.



He meaurutau i: [http://anthro.palomar.edu/homo2/images/models\\_of\\_Hss\\_evolution.gif](http://anthro.palomar.edu/homo2/images/models_of_Hss_evolution.gif)

Whakatauritea te ariā whakakapinga (ariā o te putanga mai i Āwherika) me te ariā rohe maha, ka whakamārama i te tautoko a ngā whakaaturanga rerekē i ia ariā, me ngā uauatanga kei roto.

I tō tuhinga, me:

- whakaahua i ngā ariā whakakapinga (te putanga mai i Āwherika) me te rohe maha
- whakamārama he pēhea te whakamahi i ngā puna taunaki rerekē hei tautoko i ia ariā, me ngā uauatanga o te whakamahi whakaaturanga parewae
- whakataurite i te ariā whakakapinga (te putanga mai i Āwherika) me te ariā rohe maha.

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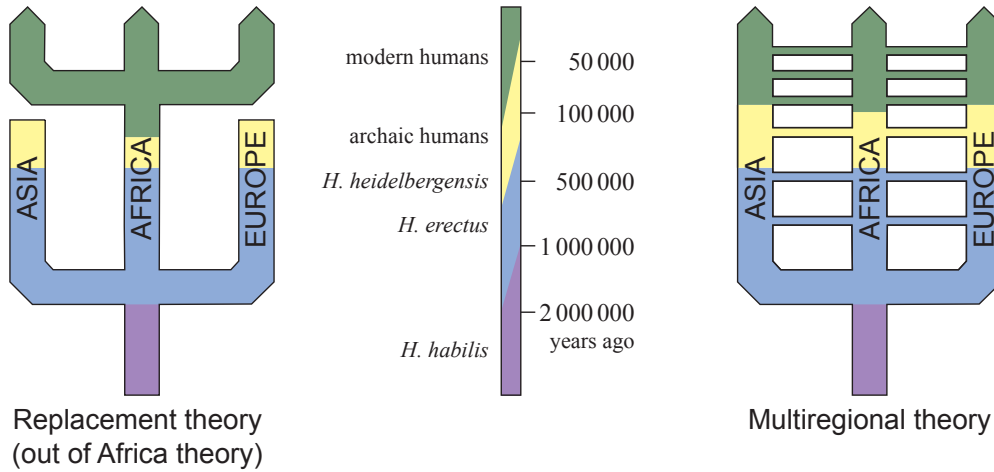
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**He wāhi anō mō tō tuhinga  
mō tēnei tūmahi kei ngā  
whārangi 12 me 13.**

### QUESTION THREE

There is a lot of debate about how modern humans dispersed throughout the world. As more fossil evidence is discovered, and DNA is extracted and analysed, the ideas of human dispersal have changed in recent years. The two main widely accepted theories are the multiregional theory and the replacement theory (out of Africa theory).

Multiple sources of evidence are used to support each theory, such as DNA analysis, mtDNA analysis, and fossil structure.



Adapted from: [http://anthro.palomar.edu/homo2/images/models\\_of\\_Hss\\_evolution.gif](http://anthro.palomar.edu/homo2/images/models_of_Hss_evolution.gif)

Compare and contrast the replacement theory (out of Africa theory) with the multiregional theory, explaining how different evidence supports each theory, and any challenges involved.

In your answer:

- describe the replacement (out of Africa) and multiregional theories
- explain how different sources of evidence are used to support each theory, and the challenges with using fossil evidence
- compare and contrast the replacement theory (out of Africa theory) with the multiregional theory.

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**There is more space for your answer to this question on pages 12 and 13.**





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

TAU TŪMAHI

MĀ TE  
KAIMĀKA  
ANAKE



*English translation of the wording on the front cover*

## **Level 3 Biology, 2017**

### **91606 Demonstrate understanding of trends in human evolution**

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

91606M

<b>Achievement</b>	<b>Achievement with Merit</b>	<b>Achievement with Excellence</b>
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 2–15 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.**