

3

91606



916060



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

## Level 3 Biology, 2017

### 91606 Demonstrate understanding of trends in human evolution

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

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 2–12 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.**

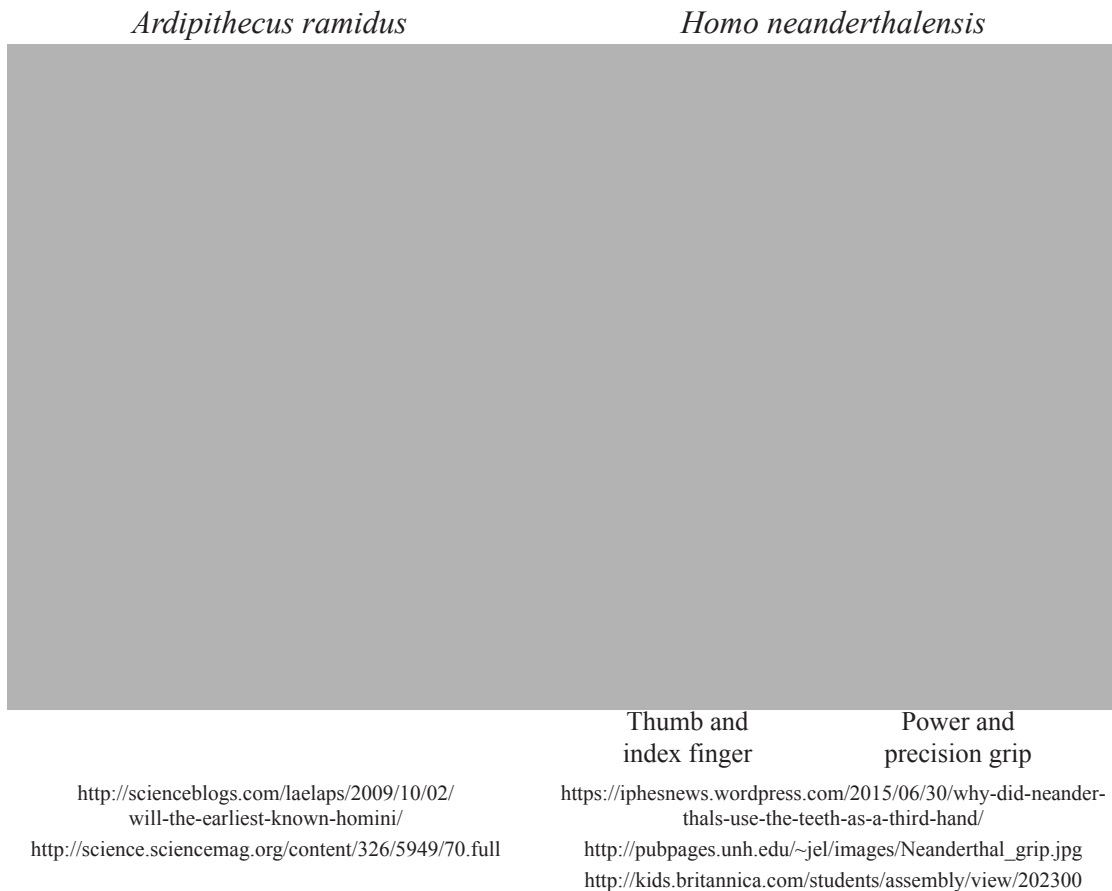
TOTAL

ASSESSOR'S USE ONLY

## QUESTION ONE

ASSESSOR'S  
USE ONLY

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.



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.

---

---

---

---

---

---

---

---

---

---

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



**This page has been deliberately left blank.**  
**The examination continues on the following page.**

## 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=e872917f8c94dc9a9e00d062639f33374>

### 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.

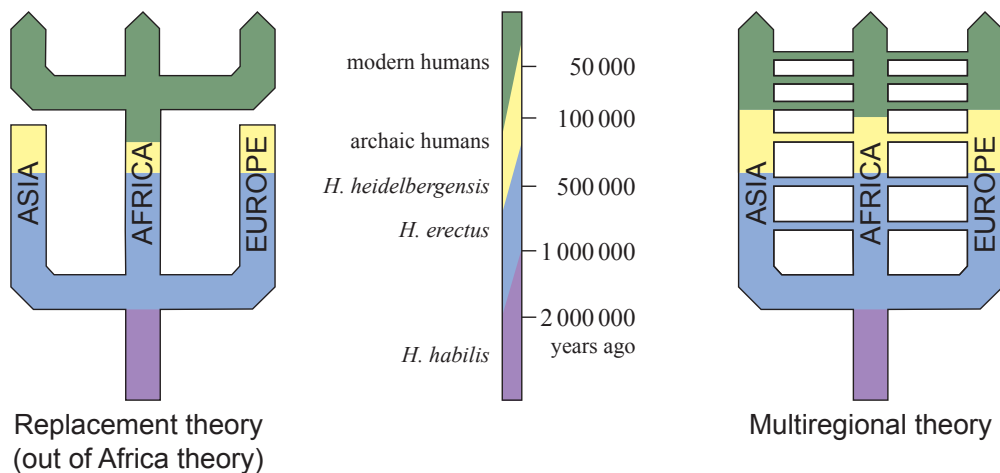
**There is more space for your  
answer to this question on the  
following page.**



### 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.

**There is more space for your answer to this question on the following pages.**





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

ASSESSOR'S  
USE ONLY

QUESTION  
NUMBER

91606