

91606



Draw a cross through the box (X) if you have NOT written in this booklet

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**Mana Tohu Mātauranga o Aotearoa**  
New Zealand Qualifications Authority

## Level 3 Biology 2023

### 91606 Demonstrate understanding of trends in human evolution

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.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (DO NOT WRITE). This area will be cut off when the booklet is marked.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

## QUESTION ONE: THE LAETOLI FOOTPRINTS

Discovered in 1977 at Laetoli in Tanzania, hominin footprints thought to be approximately 3.66 million years old gave us the earliest, clear evidence of bipedalism in the hominim/human fossil record. These footprints are widely considered to have been made by *Australopithecus afarensis*.

A comparison was made between the Laetoli footprints, those of a modern human, and a chimpanzee.



Footprint comparison for modern humans, Laetoli hominin footprints, and modern chimpanzee (from left to right)

Discuss the influence of the evolution of the leg and foot to allow for bipedal locomotion.

In your answer, include discussion of:

- TWO differences between the three footprints, with descriptions
- how the environment may have led to changes in the structure of the leg and foot, enabling more efficient bipedal locomotion
- how being bipedal could have led to changes in the diet of early hominins and how these contributed to their success.

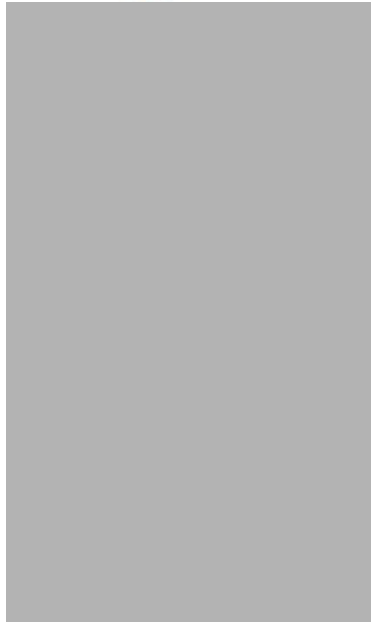
There is more space for  
your answer to this question  
on the following page.



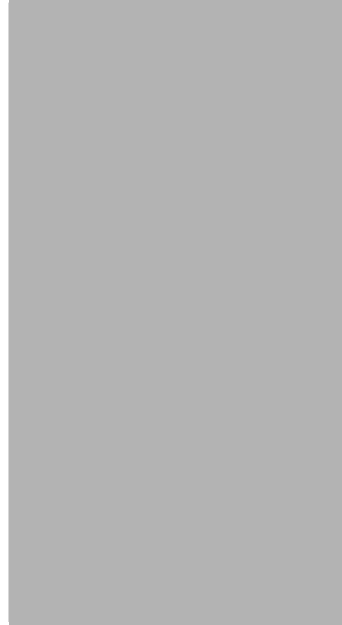
## QUESTION TWO: TOOLS

There is evidence and description of many hominin tool cultures since *Homo habilis* used Oldowan tools. Acheulian tool culture came later, depicting a number of changes in tools. These changes have been linked to likely changes in the brain.

A power grip in hominin hands is often demonstrated when depicting Oldowan tool use, while a precision grip is often demonstrated when depicting later tools, such as Acheulian and Mousterian.



Precision grip



Power grip

Discuss how hominin evolution was influenced as a result of tool use.

In your answer, include discussion of:

- TWO benefits resulting from early hominins' **use of** stone tools
- an advantage of both the power grip and the precision grip to the use of tools
- TWO named changes to tools from the Oldowan tool culture to the Acheulian tool culture, and how these changes gave advantages to *Homo erectus* or *Homo ergaster*.

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





### QUESTION THREE: DISPERSAL

Modern humans migrated out of Africa around 60,000 years ago. This map shows their migration



Discuss reasons for the success of *Homo sapiens*.

In your answer, include discussion of:

- the place and timing of the origin of *Homo sapiens* in both the Out of Africa hypothesis and the multiregional hypotheses of human dispersal
- why migration from the Middle East to Asia may have been easier and faster than the migration from Africa to Europe
- how changes in abstract thought and brain development would have led to better shelter and food gathering for the migrating *Homo sapiens*.



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



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

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### Acknowledgements

Material from the following sources has been adapted for use in this assessment:

#### Page 2

Image: <https://royalsocietypublishing.org/doi/10.1098/rspb.2016.0235>

#### Page 5

Image: [https://www.researchgate.net/figure/A-precision-grip-left-and-a-power-grip-right-based-on-Napier-1956\\_fig2\\_51586020](https://www.researchgate.net/figure/A-precision-grip-left-and-a-power-grip-right-based-on-Napier-1956_fig2_51586020)

#### Page 8

Map: <https://education.nationalgeographic.org/resource/global-human-journey/>