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NZQA | Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 3 Biology 2025

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 2–16 in the correct order and that none of these pages is blank.

Do not write in the margins (////). 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: Bipedalism

Australopithecines are considered the first fully bipedal hominin. Figure 1 below shows the pelvis and leg bones of a chimpanzee, an australopithecine, and a modern human. Chimpanzees are quadrupedal and typically use 'knuckle-walking'; however, they can walk bipedally under specific circumstances.

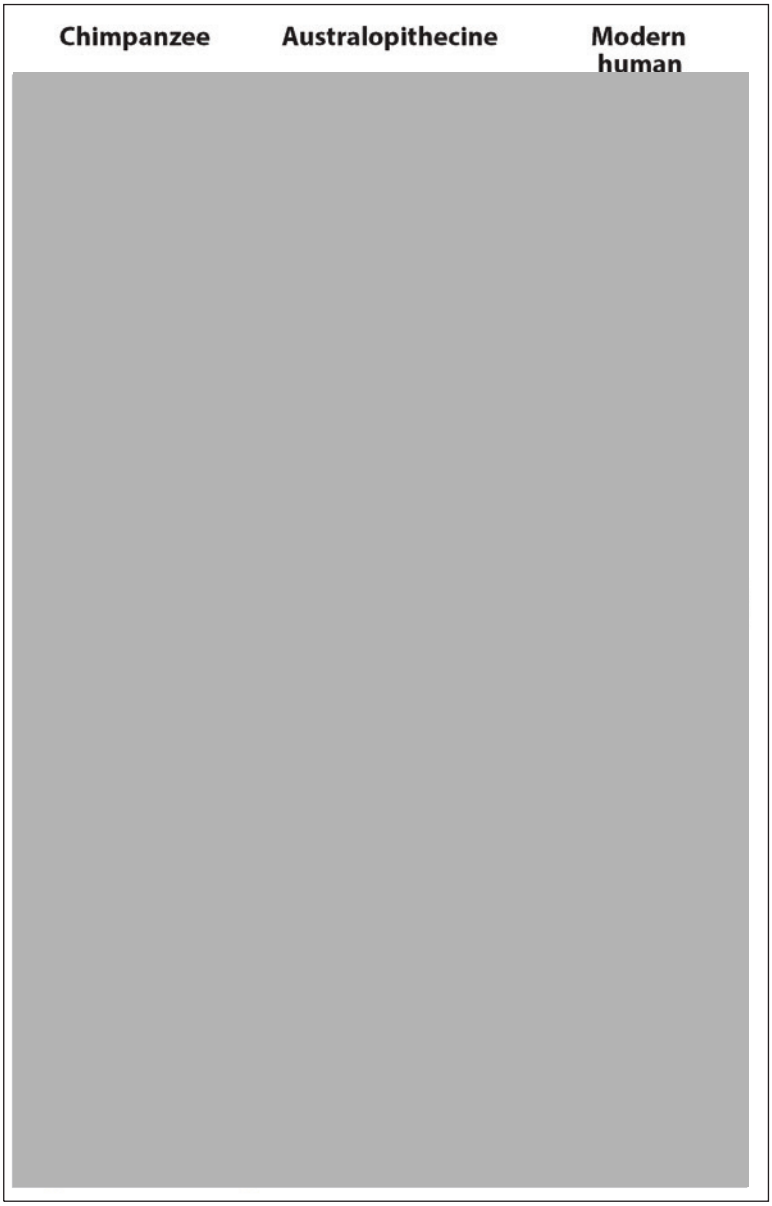

Figure 1: The pelvis and lower limbs of a chimpanzee, an australopithecine, and a modern human.

Discuss differences seen in the skeleton of australopithecines.

In your answer, include discussion of:

- a description of how skeletal changes in the pelvis, femur, and knees enabled efficient bipedal walking
- TWO advantages of bipedal walking for australopithecines in Africa
- a disadvantage of bipedal walking for australopithecines in Africa
- TWO possible selection pressures that biologists think led to the skeletal changes.

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QUESTION TWO: Hominin hands

The biological evolution of hominin hands is directly linked to cultural evolution in a positive feedback loop. It is thought skeletal changes to the hand occurred slightly before hominin brain expansion.

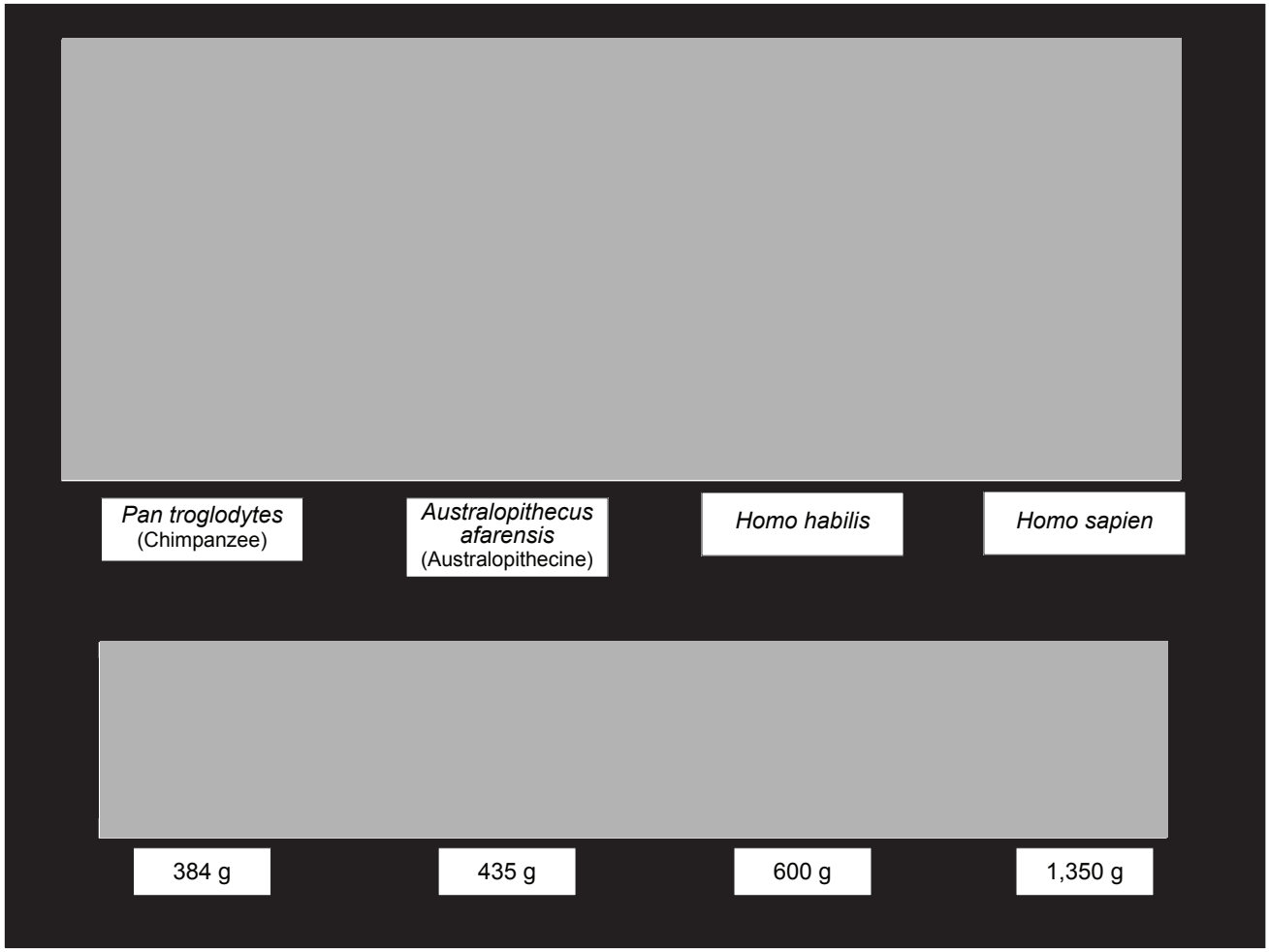

Figure 2: Hand bones and skulls of a chimpanzee, an australopithecine, *Homo habilis,* and *Homo sapien* (left to right).

Discuss the positive feedback relationship between the evolution of hominin hands, brain expansion, and cultural evolution.

In your answer, include discussion of:

- the relationship between biological evolution and cultural evolution
- how TWO changes to the hominin hand may have influenced hominin brain expansion
- how a change to the hominin hand may have influenced the development of tools
- an advantage and a disadvantage that biological evolution has had on cultural evolution.

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QUESTION THREE: The dispersal of *Homo sapiens*

Evidence shows that a large migration of modern *Homo sapiens* occurred out of Africa around 60 000–70 000 years ago. These *H. sapiens* rapidly colonised new areas and lived in the same areas as Neanderthals and Denisovans, at the same time. Evidence suggests the Neanderthals' probable range was Europe and the Denisovans' probable range was Asia.

Figure 3: Hominin species around 60 000 years ago.

Discuss the possible reasons why Neanderthals and Denisovans were more restricted geographically than *H. sapiens* and the factors that influenced the successful dispersal of modern *H. sapiens*.

In your answer, include discussion of:

- a description of the Out of Africa (replacement) hypothesis
- how the ability to make clothing and shelter helped hominin species disperse into new environments
- how specialised adaptations and inbreeding of Neanderthals and Denisovans may have affected their survival and ability to disperse
- how abstract thought and communication in *H. sapiens* helped them to disperse across Europe and Asia.

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QUESTION NUMBER

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

Figure 1: https://www.britannica.com/science/human-evolution/Background-and-beginnings-in-the-Miocene
Figure 2: https://www.researchgate.net/publication/306035622_Evolution_of_the_Early_Hominin_Hand
https://commons.wikimedia.org/wiki/File:Pan_troglodytes_05_MWNH_230.jpg
https://australian.museum/learn/science/human-evolution/australopithecus-afarensis/
https://humanorigins.si.edu/evidence/human-fossils/fossils/knm-er-1813
https://www.bradshawfoundation.com/origins/homo_sapiens.php
Figure 3: http://atlasofhumanevolution.com/HomoSapiens.asp (time line set to 60 000 years ago)