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91606M



916065



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## Mātai Koiora, Kaupae 3, 2022

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

Ngā whiwhinga: E 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 tōtōpū ki ngā ia i roto i te kunenga tangata.

Tirohia kia kitea ai 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 KATOĀ kei roto i tēnei pukapuka.**

Ki te hiahia wāhi atu anō koe mō ō tuhinga, whakamahia ngā whārangi wātea kei muri o tēnei pukapuka.

Tirohia kia kitea ai e tika ana te raupapatanga o ngā whārangi 2–19 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

Kaua e tuhi ki ngā wāhi e kitea ai te kauruku whakahāngai (X). Ka poroa pea taua wāhanga ka mākahia ana te pukapuka.

**HOATU TĒNEI PUKAPUKA KI TE KAIWHAKAHAERE Ā TE MUTUNGA O TE WHAKAMĀTAUTAU.**

## TE TŪMAHI TUATAHI: *HOMO BODOENSIS*

Te mātāpuna: [www.dailymail.co.uk/sciencetech/article-10140669/Meet-Homo-bodoensis-Newly-identified-ancient-human-species-lived-Africa-500-000-years-ago.html](http://www.dailymail.co.uk/sciencetech/article-10140669/Meet-Homo-bodoensis-Newly-identified-ancient-human-species-lived-Africa-500-000-years-ago.html)

Te mātāpuna: <https://atlasvirtual.com.br/homobodoensis.htm>

E kī ana ngā kairangahau ehara nō te *Homo heidelbergensis*, nō te *Homo rhodesiensis* rānei tētahi angaanga i kitea rā i Bodo D'ar, i Etiopia, i Awherika ki te Rāwhiti i ngā tau 1970, engari nō tētahi momo hou kē. Kāore anō kia whakaraupapahia te pītau ira pata pūngao (mtDNA) me te pītau ira karihi (nDNA).

Kua kīia he kahika tōtika te *Homo bodoensis* nō tō tātou momo, nō te *Homo sapiens*. Kāore anō te momo *Homo bodoensis* kia tautohua mai i ngā mātātoka hou, engari nō te mātaitia anō o ngā mea tawhito. Ko te whakatau tata i tēnei wā, i ora te *Homo bodoensis* i waenganui i ngā tau 770 000 me te 126 000 ki muri, ā, kei te takiwā pea o te 500 000 ki te 600 000 tau ki muri te tawhito o te taurira e whakaaturia ana i konei.

He rahi ake te pakohu roro o te mātātoka o te angaanga tērā i tō te *Homo erectus*, heoi anō, he iti iho i tō te *Homo sapiens*, ā, ka puta te whakaaro he momo tēnei nō te wā i waenganui i a rāua. Nā te mea kāore e rite ana ngā āhuatanga o te pakohu roro, e whakaarohia ana ehara te *Homo bodoensis* i te kahika o ngāi Neanderthal, o ngāi Denisovan rānei. Kei te takiwā o te 1250 cm<sup>3</sup> te whakatau tata mō te rōrahi o roto i te pakohu roro.

Arā hoki te huhua o ngā kōiwi i whakaarohia rā nō te *Homo heidelbergensis* kua tautuhia anō, kua kīia ināianei nō te *Homo bodoensis*. I runga i ngā mōhiotanga ki ēnei kōiwi, kua puta te whakaaro i tae atu pea te *Homo bodoensis* ki te taha rāwhiti-mā-tonga o Ūropi, heoi, i mate katoa i reira i te takiwā pea o te 200 000 tau ki muri.

Matapakina te wāhi ki ngā mātauranga hou e puta ai he panonitanga ki ngā ariā kunenga tangata.

I tō tuhinga, me:

- whakaahua te tikanga o te 'tangata onamata' (hominin) me te 'rōrahi o roto i te pakohu roro' (endocranial capacity)
- whakamārama te whakamahinga o ngā taunaki pītau ira hou (mai i te pata pūngao (mtDNA) me te karihi (nDNA)) hei whakatau tata i ngā takiwā i tangongi ai ngā momo, me te āhua hoki o tā ēnei taunaki pītau ira tautoko i te ariā 'I Ahu Mai i Awherika' mō te takenga mai o te tangata hou.
- matapaki te āhua o te āwhina a ngā panonitanga ki te pakohu roro me ngā kōiwi ringa i te āhua noho o te *Homo bodoensis*, ina whakatairitea ki ngā tāngata onamata.

## QUESTION ONE: *HOMO BODOENSIS*

Source: [www.dailymail.co.uk/sciencetech/article-10140669/Meet-Homo-bodoensis-Newly-identified-ancient-human-species-lived-Africa-500-000-years-ago.html](http://www.dailymail.co.uk/sciencetech/article-10140669/Meet-Homo-bodoensis-Newly-identified-ancient-human-species-lived-Africa-500-000-years-ago.html)

Source: <https://atlasvirtual.com.br/homobodoensis.htm>

Researchers suggest that a skull found in Bodo D'ar, Ethiopia, East Africa in the 1970s belongs to neither *Homo heidelbergensis* or *Homo rhodesiensis*, but instead, is a new species entirely. Both mitochondrial DNA (mtDNA) and nuclear DNA (nDNA) have yet to be sequenced.

*Homo bodoensis* has been suggested as a direct ancestor of our species *Homo sapiens*. The *Homo bodoensis* species hasn't been identified from new fossils, but on the re-examination of old ones. *Homo bodoensis* is currently estimated to have lived between 770 000 and 126 000 years ago, with the specimen shown dated to around 500 000 to 600 000 years ago.

The fossil of the skull has an enlarged cranium compared to *Homo erectus*, but smaller than *Homo sapiens*, which suggests it is an intermediate species between them. *Homo bodoensis* is not thought to be an ancestor of the Neanderthals or the Denisovans, as the cranium does not share similar features. The endocranial capacity is estimated to be approximately 1250 cm<sup>3</sup>.

A number of other remains previously thought to be *Homo heidelbergensis* have also been reclassified as *Homo bodoensis*. Based on these remains, there are suggestions that *Homo bodoensis* may have reached south-east Europe, but died out there about 200 000 years ago.

Discuss how new knowledge can lead to changes in human evolution theories.

In your answer:

- describe what is meant by the terms hominin and endocranial capacity
- explain how new DNA evidence (from mitochondria (mtDNA) and nuclear (nDNA)) can be used to approximate times of species divergence, and how this DNA evidence might support the Out of Africa Theory of modern human origins
- discuss how changes to the cranium and hand bones would benefit the lifestyle of *Homo bodoensis* compared with earlier hominins.

*He wāhi anō mō tō tuhinga  
mō tēnei tūmahi kei ngā  
whārangi o muri mai.*

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





## TE TŪMAHI TUARUA: NGĀ NEANDERTHAL



Te mātāpuna: <https://www.smithsonianmag.com/science-nature/rethinking-neanderthals-83341003/>

I kuneroa mai ngā Neanderthal i Ūropi me Āhia i te wā e kuneroa mai ana ngā tāngata hou i Āwherika. Nā runga i ngā taunakitanga kōiwi o Peina ki te raki me Ingarangi, kua pūmau kē te noho a ngā Neanderthal ki Ūropi i ngā tau 400 000 ki muri.

I rangiwhāwhā te noho a ngā Neanderthal – mai i Potukara me Wēra i te uru, whakawhiti atu ki ngā Maunga Altai o Haipīria i te rāwhiti. Heoi anō, i nui te panonitia o te whānui o te noho, nā ngā pānga o te takiwā kōpaka – i ētahi wā i wātea he arawhiti whenua, i ētahi atu wā, he tio, he wai noa rānei. I te takiwā o te 300 000 tau ki muri, i ara ake i ngā Neanderthal tētahi hangarau pāraharaha kōhatu e mōhiotia ana ko te tikanga Levallois. Ko te hangarau nei, ko te hanga tauira hukihuki ki te kōhatu e taea ana te rāwekeweke kia oti mai ai he pāraharaha pai ā tōna wā. Nā tēnei hangarau i taea ai e ngā Neanderthal te wehe atu ngā puna rawa taketake me te āhei tonu ki te hanga pāraharaha i ngā wā e hiahiatia ai.

E tohu mai ana ngā wharanga kōiwi i kitea rā i ngā Neanderthal, ka whara ana he Neanderthal, kua tahuri ētahi ki te āwhina i a ia.

Nō te tau 1997 i tīmata ai te kohinga o te pītau ira tuauri o ngā mātātoka Neanderthal, ā, kua hua mai i tēnei te whakahoutanga o ngā huinga ira huhua. Ko tā ēnei e tūtohu nei, he āhua iti noa iho te taupori me te kanorau o ngā Neanderthal e noho mai ana i Peina ki Haipīria i roto i ō rātou tau whakamutunga 20 000. I kitea hoki i te huinga ira o tētahi wahine kotahi nō ngā Maunga Altai ngā tohu o te aitata tautini i roto i tōna taupori.

I te āhua nei i riterite tonu te wehea o ngā rōpū Neanderthal i ngā tau 100 000 whakamutunga, nā te putuputu o ngā maneitanga āhuarangi, ko ētahi he inati tonu. Nā konei i taupātia ai te rea haere o ngā taupori nui me ngā tītaringa motukore puta noa i ō rātou whenua noho.



## QUESTION TWO: NEANDERTHALS



Source: <https://www.smithsonianmag.com/science-nature/rethinking-neanderthals-83341003/>

Neanderthals evolved in Europe and Asia while modern humans were evolving in Africa. Judging from fossil evidence from northern Spain and England, Neanderthals were already well established in Europe by 400 000 years ago.

Neanderthals ranged widely – from Portugal and Wales in the west across to the Altai Mountains of Siberia in the east. The range changed a lot, due to the effects of the ice age, when at times, there were land bridges and at other times, ice or water. Around 300 000 years ago Neanderthals developed a stone tool technology known as the Levallois technique. This involved making pre-shaped stone cores that could be worked into a finished tool at a later time. It meant Neanderthals were free to travel away from sources of raw material and yet be able to make tools when needed.

The bone damage found on Neanderthals suggests they were assisted in their recovery after injury.

Ancient DNA began to be recovered from Neanderthal fossils in 1997, and this has led to the reconstruction of several complete genomes. These indicate that Neanderthals living from Spain to Siberia were relatively low in both population and diversity during their last 20 000 years. The genome of one female individual from the Altai Mountains also shows signs of long-term inbreeding in her population.

It seems that regular, and sometimes extreme, climatic fluctuations continually fragmented Neanderthal groups during the last 100 000 years, preventing them from building up large populations and continuous distributions across their range.

Matapakina ngā take i angitu ai, i korehāhā anō ai hoki ngā Neanderthal.

I tō tuhinga, me:

- whakaahua te āhua o te whakaaweawe a te takiwā kōpaka i ngā nekeneke a ngā taupori Neanderthal
- whakamārama tētahi huapai me tētahi huakino ki te porihanga Neanderthal o tā rātou tiaki i ngā huānga e whara ana
- matapaki te āhua o te korenga o ngā Neanderthal i ora tonu i muri mai o te takiwā o te 39 000 tau ki muri, ahakoa i whai hua ki a rātou te hangarau Levallois hei waihanga pāharaha.

*He wāhi anō mō tō tuhinga  
mō tēnei tūmahi kei ngā  
whārangi o muri mai.*

Discuss reasons for both the success of, and the extinction of, Neanderthals.

In your answer:

- describe how the ice age influenced the movement of populations of Neanderthals
- explain an advantage and a disadvantage to Neanderthal society of caring for injured group members
- discuss how even though Neanderthals were advantaged by having the Levallois technique for tool manufacture, the species did not survive past approximately 39 000 years ago.

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





## TE TŪMAHI TUATORU: TE NEKEHANGA O NGĀ TĀNGATA ONAMATA

E whakaaturia ana e ngā tauira kōiwi, i waerua ō tātou tīpuna i te tuatahi, ā, ka whai mai ko ngā panonitanga ki nga niho me ngā kauae. Nō muri noa mai i tērā tō tātou motuhaketanga hei *Homo sapiens* i runga anō i te nui ake me te tuatini ake o ō tātou roro, i hua ake ai te whakaratanga o ngā kararehe pērā i te kurī i te takiwā pea o te 10 000 tau ki muri, me te poaka i te takiwā pea o te 8000 tau ki muri.

Matapakina ngā āhuatanga o te kunenga mai o te *Homo sapiens* me ngā nekehanga ki roto o Te Moana-nui-a-Kiwa.

I tō tuhinga, me:

- whakaahua te āhua o te huanga ake o te pēhanga whiringa mō te waeruatanga i te mātao haeretanga me te maroke haeretanga o Āwherika
- whakamārama ngā tūtohu ka puta ki a tātou mō te āhua noho o te tangata onamata i ngā niho iti iho
- matapaki te wāhi ki te roro tuatini ake i angitu ai te whakaratanga o ngā kurī me ngā poaka, ā, nā runga i tēnei āhuatanga, matapakina te āhua o te angitu o te heke a ngāi *Homo sapiens* puta noa i Ūropi, ā, tae noa mai ki Te Moana-nui-a-Kiwa.

He wāhi anō mō tō  
tuhinga mō tēnei tūmahi kei te  
whārangi o muri mai.

**QUESTION THREE: MOVEMENT OF HOMININS**

Fossil evidence shows that our ancestors became bipedal first, and this was followed by changes to the teeth and jaws. It was only much later that our larger and more complex brains set us apart as *Homo sapiens*, leading to the domestication of animals such as the dog about 10 000 years ago, and the pig about 8000 years ago.

Discuss aspects of *Homo sapiens* evolution and movement into the Pacific.

In your answer:

- describe how a cooler and drier Africa resulted in a selection pressure for bipedalism
- explain what smaller teeth can tell us about the hominin lifestyle
- discuss how the more complex brain would have led to the success of domestication of dogs and pigs and how these enabled *Homo sapiens* to successfully migrate through Europe and into the Pacific.

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







**He whārangi anō ki te hiahiatia.  
Tuhia te tau tūmahi mēnā e hāngai ana.**

TE TAU  
TŪMAHI

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

QUESTION  
NUMBER

*English translation of the wording on the front cover*

## Level 3 Biology 2022

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

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.

Check that this booklet has pages 2–19 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (▨). This area may be cut off when the booklet is marked.

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