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91606



# Level 3 Biology, 2014

# 91606 Demonstrate understanding of trends in human evolution

9.30 am Thursday 13 November 2014 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 space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–10 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.

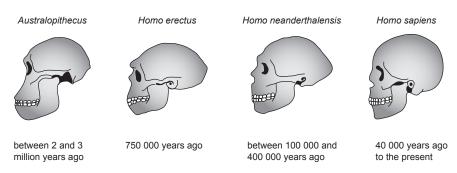
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## QUESTION ONE: HUMAN BIOLOGICAL EVOLUTION - BRAIN NOT BITE

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Recent evidence indicates that a single gene mutation resulting in weakened jaw muscles may have been significant in the early evolution of hominins around 2.4 million years ago, as changes to muscle anatomy can also alter the bones to which they attach.

## **Evolution of the Skull**



Adapted from: http://www.infovisual.info/03/019\_en.html

Relate the significance of weakened jaw muscles and changes in skull structure to human biological evolution.

In your answer:

- describe the changes in skull structure that occurred
- explain how a change in jaw muscle anatomy may have influenced changes to skull structure

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#### **QUESTION TWO: HUMAN CULTURAL EVOLUTION**

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At Olduvai Gorge, in Tanzania, Africa, there is a rock layer containing animal bones with evidence of the use of tools to remove the flesh. This layer has been dated at around 1.84 – 1.85 million years ago and is therefore associated with *Homo habilis* occupation. Nearby in the hills is the site where harder rock to make the tools was found.

Analyse the importance of this find to our understanding of early hominins and tool use.

In your answer:

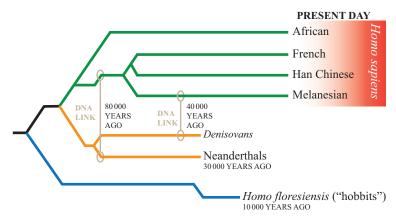
- identify and describe the tool culture associated with *Homo habilis*
- explain how the tools would have most likely been sourced, produced, and used

nalyse how this evidence contributes to our understanding of the possible behaviour cabilis in this area.					

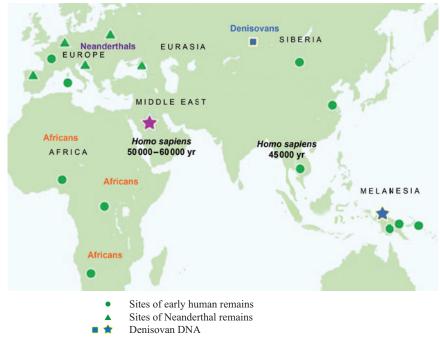
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OOL ONE!

#### QUESTION THREE: DISPERSAL OF HOMININS - MORE THAN ONE

Both the sequencing of the Neanderthal genome and genetic evidence (both mitochondrial DNA and nuclear DNA) from the Denisova Cave in Siberia, have brought in new evidence that raises further questions with regards to hypotheses of human dispersal.



Adapted from: http://io9.com/5939148/new-dna-evidence-could-explain-what-happened-to-the-neanderthals



Adapted from: http://www.wired.com/wiredscience/2010/12/denisovans/

## Recent scientific information suggests that:

- 1. Neanderthals diverged from modern humans between 270 000 and 440 000 years ago.
- 2. Neanderthals are more closely related to non-Africans than to Africans, and were distributed East-West across central Europe to Asia.
- 3. Denisovans share a common ancestor with Neanderthals and diverged from them around 640 000 years ago, and were distributed North-South from Siberia to South-East Asia.
- 4. Denisovans are more closely related to modern Melanesians (from, for example, Papua New Guinea, Australia, Solomon Islands, Vanuatu, and Fiji), which carry an additional 5% of Denisovan DNA.
- 5. Modern non-African humans have inherited about 2.5% of their DNA from Neanderthals.
- 6. Evidence of Neanderthal, Denisovan, and modern human occupation can be found in the Denisova cave, though this may be inconclusive.

Evaluate, using the information above, the likely implications of this for the dispersal and relative ASSESSOR'S USE ONLY lack of genetic variation in modern humans. In your answer: describe a likely pattern of dispersal of modern humans explain the reasons for the hominin populations to be both similar and different evaluate the implications of the information (1-6) above, to the dispersal and the relative lack of genetic variation in modern humans.

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

following page.

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