

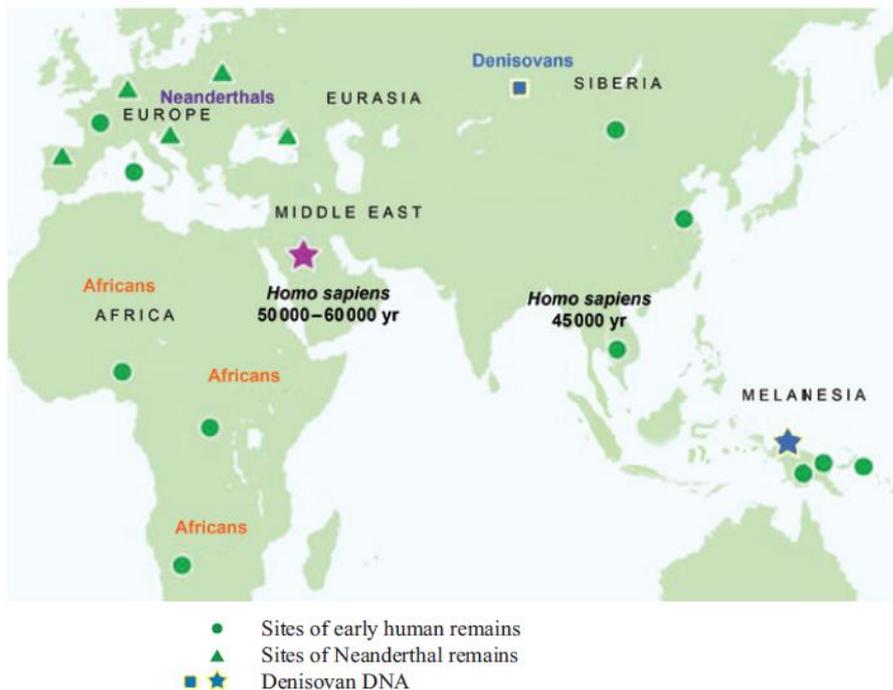
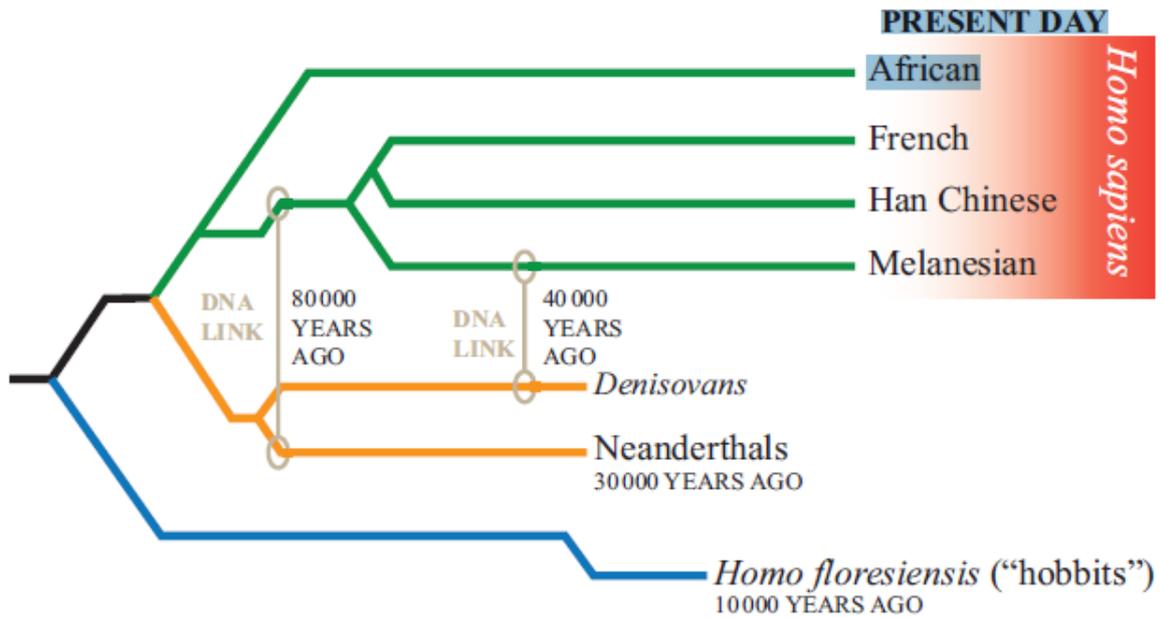
AS 91606 Demonstrate understanding of trends in human evolution

Human Dispersal

(2014, 3)

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.



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 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.

(2013, 3)

Analysis of genetic and fossil evidence (made over a number of years by a number of researchers) has indicated the following information about human dispersal:

1. Non-African males share a common ancestor about 140 000 years ago.
2. All humans share a common ancestor about 200 000 years ago.
3. Fossils (such as “Peking man” dated at about 750 000 years ago in Asia) seem to show a combination of *H. sapiens* and *H. erectus* type features.
4. Africans are more genetically diverse than other races.
5. Non-Africans include small (1– 4%) traces of ancient hominin DNA (such as *H. neanderthalensis*).

Use **some or all** of the above evidence to discuss the likely origin of modern humans.

In your answer:

- describe the main competing theories: **Multiregional** and **Out of Africa** (also known as Eve / Replacement / Recent African Origin)
- explain how the above evidence supports each theory
- justify the most likely model of human dispersal.

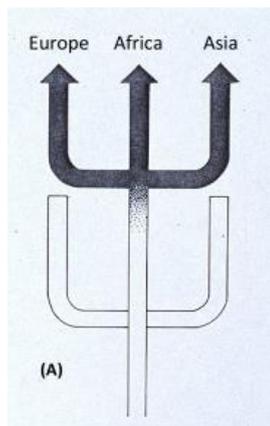
The questions below are from the now expired AS 90719 Describe trends in human evolution.

<http://www.nzqa.govt.nz/qualifications-standards/qualifications/ncea/subjects/biology/expired-standards/>

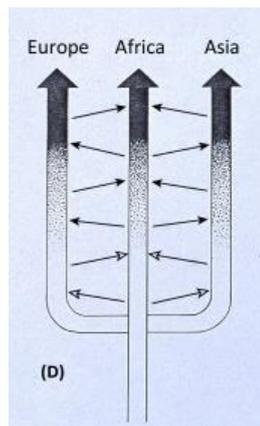
However they may still be useful for AS 91606 Demonstrate understanding of trends in human evolution

(2012, 3)

A number of theories of human dispersal exist. Two models of the theories can be summarised as shown in the diagrams below left and centre.



Out of Africa model



Multiregional model



- Site of early human remains
- ▲ Site of Neanderthal remains

In 2010, DNA sequencing of Neanderthal specimens indicated that they share as much as 4% more of their genome with non-Africans than with Africans. Also in 2010, an extinct hominin (called Denisovans) was found to share 4–6% of its genome with living humans from Melanesia, and with no other living group.

In 2011 y-chromosomal analysis indicated that all living males have descended from an ancestor that lived around 60 000 to 140 000 years ago (in Africa).

Discuss how well the 2010 and 2011 evidence supports the theories of human dispersal shown above.

In your answer you should:

- describe the “Out of Africa” and “Multiregional” theories
- explain what the 2010 and 2011 evidence indicates about early human dispersal
- discuss how the 2010 and 2011 evidence supports (or otherwise) the theories shown in the diagram above.

(2011, 3)

Periodically the Sahara region of Africa has alternated from being a hot, dry, uninhabitable desert to being warm, moist and fertile. In times of good climate, hominins have inhabited the region. Then, when the Sahara has become desert, they have been forced to move back into Africa or into Europe / Asia. This has happened at least three times in the past: around 1.7 million years ago, 500 000 years ago and 60 000 years ago. The tools associated with these periods are Acheulian, Mousterian and Palaeolithic.

- (a) Explain how these three tool cultures may have differed from each other in terms of their design and manufacture.
- (b) Investigations into the patterns of genetic variation in modern human populations have been used to support the view that the origin of *Homo sapiens* is the result of a recent dispersal event known as the “Out of Africa” model.

Supporting evidence for this model has come from studies of mitochondrial DNA (mtDNA), which is inherited through the maternal line.

There are fourteen ancestral populations in Africa, but only one outside Africa.

Discuss the pattern of dispersal this evidence supports and why the evidence has been used.

In your answer:

- describe the “Out of Africa” model
- explain why mtDNA was used to provide evidence for this model
- explain, using the “Out of Africa” model, why more diversity is found in the African *Homo sapiens* populations compared to those of Asia and Europe.