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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 3 Biology, 2007

90719 Describe trends in human evolution

Credits: Three
9.30 am Tuesday 27 November 2007

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 answer 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 2–11 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.

For Assessor's use only	**Achievement Criteria**		
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe trends in human evolution. ☐	Explain trends in human evolution. ☐	Discuss trends in human evolution. ☐
Overall Level of Performance ☐		

You are advised to spend 40 minutes answering the questions in this booklet.

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QUESTION ONE: TRENDS IN BIOLOGICAL EVOLUTION

A number of features of the postcranial skeleton are linked to bipedalism in humans and other hominins.

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Comparison of pelvic girdle and foot of chimpanzee and two hominins
http://anthro.palomar.edu/hominid/australo_2.htm

(a) The foot of the chimpanzee is different from that of hominins.

(i) Describe ONE skeletal feature of the foot of the chimpanzee that differs from that of a hominin.

(ii) Explain how this difference is linked to bipedalism.

(b) Describe **two** differences between the chimpanzee and hominin **pelvic girdles** that are related to bipedalism.

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(c) Explain the **relationship** between the shape of the pelvic girdle and the ability to walk bipedally.

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The X-ray below shows the pelvis of a modern human, with the pelvic inlet marked. *Homo erectus* had a narrower pelvic inlet than *H. sapiens*.

Modern human pelvis, showing pelvic inlet
http://www.wheelessonline.com/image8/inlet.jpg

(d) Explain **why** the pelvic inlet is larger in *Homo sapiens* than in *H. erectus*.

(e) The width of the pelvic inlet is related to locomotion. *H. erectus* had a narrower pelvic inlet than modern humans, and walked more efficiently.

Discuss how conflicting selection pressures have acted on the evolution of the pelvic inlet in modern humans.

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QUESTION TWO: CULTURAL EVOLUTION

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There is evidence that *Homo erectus* used fire.

(a) Explain TWO **benefits** to *Homo erectus* of using fire.

The diagram below shows the relationship between brain volume and fossil age.

Relationship between brain volume and age of hominin fossils
http://cas.bellarmine.edu/tietjen/Laboratories/Bio%20Pix%204%20U/Bio%20Pix.htm

(b) Describe the **trend** in brain volume shown in this graph.

(c) Discuss the **relationship** between cranial capacity and cultural evolution in hominins. Support your answer with reference to ONE aspect of cultural evolution in **named hominin species**. (Aspects of cultural evolution include, but are not limited to: tool use and manufacture; art; language; domestication of plants and animals.)

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QUESTION THREE: PATTERNS OF DISPERSAL

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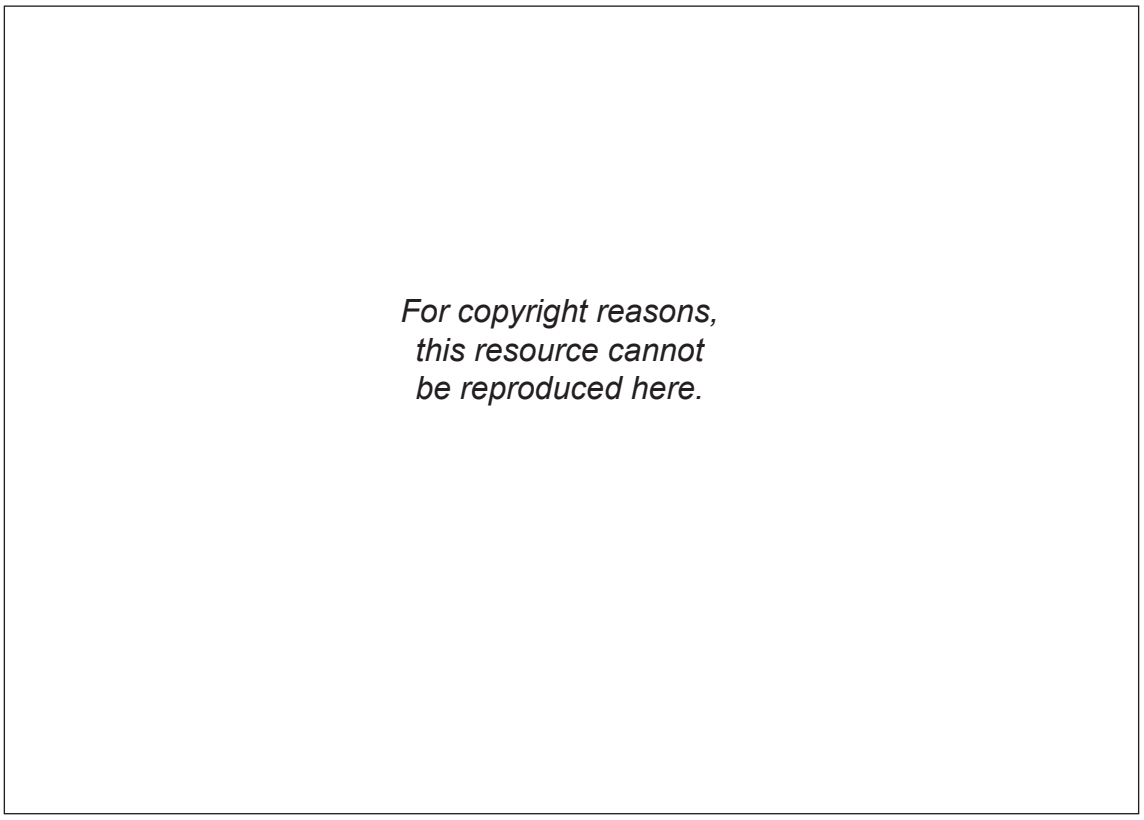
Most scientists agree that *Homo erectus* was the first hominin species to migrate out of Africa. Probable migration routes are shown below.



Migration routes, and earliest occupation dates, for *H. erectus* in Africa and Eurasia.
http://www.shes.rdg.ac.uk/SHESresearch/Archaeology/Prehistoric/Simulation.htm

(a) Describe the relative speed at which this migration took place AND give evidence to support your answer.

Relative speed of migration:

Evidence:

Recent research suggests that climate change is related to the migration out of Africa of various hominin species.

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(b) Discuss the impact a change in climate from wet tropical to cooler drier conditions would have on migration out of Africa by ***H. erectus***.

Note that this question continues on the next page.

H. erectus reached the island of Flores, in Indonesia, about 1.8 million years ago. Sea levels had been lowered by widespread glaciation, and Flores was separated from the western island of Sumbawa by an ocean channel that was deep, but perhaps only 2.5 km wide (modern distance 23.5 km). Some scientists feel that *erectus* must have used boats or rafts to cross this channel.

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(c) Discuss what the ability to make a boat or raft indicates about the behaviour and cultural evolution of *Homo erectus*.

Extra paper for continuation of answers if required.
Clearly number the question.

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