



91606

Mana Tohu Mātauranga o Aotearoa New Zealand Qualifications Authority

Level 3 Biology 2023

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 2–12 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (^{ov Wate in t}). 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: THE LAETOLI FOOTPRINTS

Discovered in 1977 at Laetoli in Tanzania, hominin footprints thought to be approximately 3.66 million years old gave us the earliest, clear evidence of bipedalism in the hominim/human fossil record. These footprints are widely considered to have been made by *Australopithecus afarensis*.

A comparison was made between the Laetoli footprints, those of a modern human, and a chimpanzee.

Footprint comparison for modern humans, Laetoli hominin footprints, and modern chimpanzee (from left to right)

Discuss the influence of the evolution of the leg and foot to allow for bipedal locomotion.

In your answer, include discussion of:

- TWO differences between the three footprints, with descriptions
- how the environment may have led to changes in the structure of the leg and foot, enabling more efficient bipedal locomotion
- how being bipedal could have led to changes in the diet of early hominins and how these contributed to their success.

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

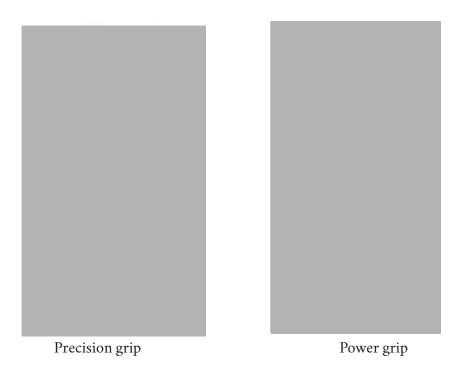
3

Biology 91606, 2023	HIS AREA DONN HIS AREA DONN TI IN THISARE N TH
	NOT WRITE IN TWRITE IN THIS ITE IN THIS
	REA DO NOT W. WRITE IN THIS DO NOT WRITE
	N THIS ARE N THIS AREA DI AREA DO NOT
	ABRAZINT MARAZIA MARAZIA ABRAZIA MAGLASIA MAGLASIA MAGLASIA
	NOT WRITEIN THE APEN NOT WRITEIN WRITEINT WRITEINT THE
	TÉ MUTHIS AREA HIS AREA DONG
	IN THIS AREA D IN THIS AREA D I'WRITE IN THIS
	WHITE IN THIS WHITE IN THIS TE IN THIS PREA TE IN THIS TE IN THIS WHITE IN THIS IN THIS APEA D WHITE IN THIS WHITE IN THIS THIS THE IN THIS THE INT THIS THE INT THIS THE INT THIS WHITE IN THIS WHITE
	NOFWRITE IN THE WITE IN THE TE IN THE ASEA TE IN THE ASEA WITE IN THE WITE IN THE WITE IN THE WITE IN THE WITE IN THE NOFWRITE IN T NOT WRITE IN T WITE IN THE NOT WRITE IN T
	HIG AREA "DO NO S AREA "DO NO" NOT WRITE
	N THIS AREA WEITE IN THIS PE IN THIS AREA PE IN THIS AREA
	HIS AREA DO IV HIS AREA DO IV WRITE IN THIS!
	NOT WRITE IN THE WRITE IN THIS TE IN THIS
	SARE NOTWAITEINT OONGTWRITEINT NOTWRITEINT
	TE IN THIS ARE! HISAREA DON S AREA DONO NOTWATE INT
	WRITE איז דאוג איז דאג איז
	TE IN THIS TE IN THIS ARES HISAREA DD N
	DO NOT WRITE NOT WRITEINT WBITE WW
	TE IN THIS REEA S AREA DONO TEINITHIS REEA THIS AREA DO GAN TO POT W SAN TO POT W S
	TEIN, THIS AREA THIS AREA DO REA DO NOT W
	TE IN THIS AREA SAREA DONO
	WRITE W THIS WE TEINITHIS AREA THIS AREA "DO REA DO NOT W
	APRA DI ALLA EM JARA APRE D'ONQ BARE D'ONQ D'NOT WRITE ATWRITE M THE MARTE M THE DE
	WRITE'IN'THIS N E IN THIS AREA IS AREA DO NO
	IN THIS AREA
	нг ні втри то чая сант м ут чая сант м ут утри темор и сант, котор и сант, и сан
	REA DO.NGT W DO NOT WRATEN OT WRITE
	NOI, WRITE IN TH NRITE IN THIS AREA D
	REA DONOT N THISAREA DO
	VÕT"WRITE IN TH VRITE IN THISAR
	IS AKUT D DO'NOT WRITE DO NOT WRITE II
	OT WRITE IN THI TE IN THIS AREA
4	HIS AREA DO NOT
4	DONOT WRITE NOT WRITE IN TH OT WRITE IN TH TEIN, THIS SEE
	DO NOT WRITE

QUESTION TWO: TOOLS

There is evidence and description of many hominin tool cultures since *Homo habilis* used Oldowan tools. Acheulian tool culture came later, depicting a number of changes in tools. These changes have been linked to likely changes in the brain.

A power grip in hominin hands is often demonstrated when depicting Oldowan tool use, while a precision grip is often demonstrated when depicting later tools, such as Acheulian and Mousterian.



Discuss how hominin evolution was influenced as a result of tool use.

In your answer, include discussion of:

- TWO benefits resulting from early hominins' **use of** stone tools
- an advantage of both the power grip and the precision grip to the use of tools
- TWO named changes to tools from the Oldowan tool culture to the Acheulian tool culture, and how these changes gave advantages to *Homo erectus* or *Homo ergaster*.

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

	NOT WRITE
6	
-	HISAREA DONOT
	IS AREA D
	OT WRITE IN TE IN TAILS? US ATEAN O INVESTING O INVEST
	VRITE IN THI
	REA DONG
	NOT WRITE NRITE IN
	NTHIS ARE
	DO NOT WRI OT WRITE
	WRITE IN TH
	IS AREA DO
	IN THIS ARE WRITE IN TH
	E IN THIS AR
	OT WRITE IN
	THIS AREA REA DO NO
	TEIN THIS P THIS AREA
	REA DO NOT
	WRITEIN TH
	NÖT WRITE WRITE IN T
	TE IN THIS A HIS AREA
	WRITE NT
	TWRITE IN T TE IN THIS P
	HISAREA DO SAREA DO NOTWRITE
	NOTWRITE DO'NGT WA NOT WRITE
	NOT WRITE WRITE IN T
	TE IN THIS A
	WRITE INT
	HIG AREA
	DO-NOT W
	WRITE N
	HIS AREA
	TÉ IN THIS
	IS AREA DO NOT WRITE NOT WRITE NOT WRITE
	NOTWRITE
	WRITEINIT RITEINITHIS NITHISAREP
	N THISAREP AREA DON RITE IN THIS
	RITEINITHIS HIS AREA ITE IN THIS RITE IN THIS REA DO NO REA DO NO REA DO NO REA DO NO REA DO NO RITE IN T WRITE IN T WRITE IN T
	N THIS'AREA
	REA DO NO
	DO NOT W
	T WRITE IN TE IN THIS
Biology 91606, 2023	TEINTHIS TORTON TWRITEIN IN HIS ARE IN HIS ARE
	IN THIS ARE

HISAREA DO	
AREA DO NOT	
REA DO NOT V	
ONOT WRITE I	-
WRITE	7
- IN THIS	
NTHIS ARCA	
HIS ANDO NOT V	
O NOT WRITE	
N. A.	
THIS P	
HIS AREA DO	
HIS AREA DO N	
REA DONOT	
DO NOT WRIT	
OT WRITE IN TH	
E IN THIS AREA	
T WRITE IN THIS	
AREA DONOT	
DONOTWRI	
UT WRITE IN TH	
E IN THIS AREA	
IS AREA DON	
REA DO NOT	
DO NOT WRVI	
NOT WRITE IN	
RITE IN THIS A	
IN THIS AREA	
NOT WRITE IN T	
DO NOT WRI	
WRITE IN	
IRITE IN THIS P	
IN THIS AREA	
REA DO NOTI	
DO NOT WRI	
Link and the second sec	
WRITE IN THIS	
E IN THIS AREA	
D NOT WRITE IN	
RITE IN THIS AF	
ONOT WRITE IN	
TWRMTE"IN#THI	
EIN THIS AREA	
IN THIS AREA	
DO NOT WRI	
NREA DO	
HID OF A DO NOT	
A DO NOT WR	
D'NOT WRITE I	
WRITEINTHIS	
A DONOT WA	
DT WRITE INT	
A DONOT WA	
ONOT WRITE .	
WRITEINITUS	
RITC	
BER DO NOT	
REA DO	
DONOT	
A DO NOT WR	
NOT WRITE	
NRITE IN THIS	
A DO NOT WS	
OT WRITE IN T	
A DO NOT WR	
NOT WRITE IN	
WRITE IN THIS	
RITE IN THICAS	
AREA DO NOT	
HIS AREA DO	
AREA DO NOT	
A DONOT WA	
DNOT WRITE N	
WRITE IN THIS	
A DONOT WA	
OT WRITE IN T	
A DONOT WA	
O NOT WRITE I	
WRITE IN THIS	
RITE IN THIS A	
AREA DO NOT	
AREA DO NOT	
A DONOTWA	
OQ NOT WRITE	
DT WRITE IN TH	
TE IN THIS ARE	
DO NOT WRITE	
NRITE IN THIS	
DO NOT WRITE	
OT WRITE IN TH	
76	
' & IN THIS AKE	
SIN THIS AREA	
A DONGT WE	
THIS AREA	
"FIN THIS AREA A DONGT WA THIS AREA DO THIS AREA DO	
ADD NOT WRITE IN THE READ OF T	

QUESTION THREE: DISPERSAL

Modern humans migrated out of Δ frica around 60.000 years ago. This man shows their migration



Discuss reasons for the success of Homo sapiens.

In your answer, include discussion of:

- the place and timing of the origin of *Homo sapiens* in both the Out of Africa hypothesis and the multiregional hypotheses of human dispersal
- why migration from the Middle East to Asia may have been easier and faster than the migration from Africa to Europe
- how changes in abstract thought and brain development would have led to better shelter and food gathering for the migrating *Homo sapiens*.

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

9

		OO NOT WRITE I NOT WRITE IN TH OT WRITE IN THE
	10	TE IN THIS AREA HIS AREA DO NO A DO NOT WRD
		DONNOT WRITE, NOT WRIT
		IS ARGA DO'NC DO'NOT WRITE 30 NOT WRITE I
		VOT WRITE IN TH VRITE IN THIS AR N THIS AREA DO
		_{KREA} DO'NOT M THIS AREA DO NOT WRITE IN TH
		VRITE"IN THIS AF N"THIS AREA DO REA DO NOT W
		OO NOT WRITE IN OT WRITE IN THI WRITE IN THIS A
		E IN THIS AREA IS AREA DO NO EA DO NOT WRY
		A DONOT WAY A DONOT WAY IN THE AREA I WATE WITTE WITTE WITTE WITTE AREA DONOT A DONOT WAY THE AREA DONOT WATE WITTE WITTE WITTE WITTE WITTE WITTE AREA DO THE AREA DONOT WI
		IS AREA DO NO A DO NOT WRI OT WRITE IN THI
		WRITE IN THIS AF TE IN THIS AREA THIS AREA DO I
		TE IN THIS AREA S AREA BOONOT TEIN THIS AREA THIS AREA DO REA DO NOT WI
		EA DO NOT WRI WRITE IN THIS AF
		HIS AREA DO. REA TO NOT WA REA TO NOT WA REA TO NOT WA RATE IN THIS R OO NOT WAREN THE NOT WAREN THE WARE IN THIS WARE IN THIS WARE IN THIS WARE IN THIS WARE IN THIS WARE IN THIS WARE AREA WARE AREA WAREA WARE AREA WARE AREA WAREA WARE AREA WARE AREA WAREA WAREA WARE AREA WARE AREA W
		WRITE IN THIS
		SAREA DONO
		DONGIWRITEI
		TE IN THIS AREA HIS AREA DO NO WRITE IN THIS
		NOT WRITE WIT WITTS WITTS WITTS TE IN THIS ARE HIS AREA TO IN WRITE IN THIS ARE WRITE IN THIS ARE WRITE IN THIS ARE WRITE IN THIS AREA WRITE WITTS NOT WRITE IN T NOT WRITE IN T
		HIG AREA DO NO SAREA DO NOT NOT WRITE IN TI
		DONGT WRITE NOT WRITE IN T WRITE IN THIS
		IN THIS AREA DI I WRITE IN THIS TÉ IN THIS AREA
		I ANTHIS AN HIS ARES OON IS ARE DONO IS ARE DONO IS ARE IN TO WRITE IN THIS WRITE IN THIS INTE
		NOT WRITEIN II WRITEIN IIIS I RITEINTHIS ÅREI
		N THISAREA DO N THISAREA DO NOTV
		HIŞAREA DONE RITE IN THISARE N THISAREA DO
		THE IN THE IN THE HIG AREA DO NOT UTE IN THIS AREA N THIS AREA NO NOT NOT REA DO ROT N REA DO ROT N WRITE IN THIS NOT WRITE NOT WRITE IN THIS THIS NOT WRITE IN THIS THIS NOT WRITE IN THIS THIS NOT WRITE IN THIS NOT WRITE NOT WRITE IN THIS NOT WRI
		NOT WRITE INT
Biol	logy 91606, 2023	T WRITEIN THIS T WRITEIN THIS IN THIS AREA T WRITEIN THIS IN THIS AREA T WRITEIN

	11	
QUESTION NUMBER	Extra space if required. Write the question number(s) if applicable.	

	Extra space if required.
1	Write the question number(s) if applicable.
TION BER	
	ledgements
aterial f	from the following sources has been adapted for use in this assessment:
age 2	
nage:	https://royalsocietypublishing.org/doi/10.1098/rspb.2016.0235
Page 5 Image:	https://www.researchgate.net/figure/A-precision-grip-left-and-a-power-grip-right-based-on-Napier-1956_ fig2_51586020
Page 8 Map:	https://education.nationalgeographic.org/resource/global-human-journey/
	Biology 91606, 2023

VRITE IN TE IN THIS AR