

**ATAR HUMAN BIOLOGY UNIT 4**

**Task 12: Human Evolution**

**Weighting : 5%**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

There are THREE sections in this test, Multiple Choice, Short Answer and Extended Answer.

This is a closed book assessment (no notes are allowed).

The time allowed to complete the test is 50 minutes.

Write your answers to the Multiple Choice section on the separate answer sheet provided.

Write your answers to the Short Answer and Extended Answer sections in space provided.

|  |  |  |
| --- | --- | --- |
|  | **Marks Allocation** | **Your Total** |
| **Multiple Choice** | 10 |  |
| **Short Answer** | 37 |  |
| **Extended Answer** | 8 |  |
| **TOTAL** | 55 |  |

**ATAR HUMAN BIOLOGY UNIT 4**

**TEST: Human Evolution**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Multiple Choice Answer Sheet**

**Use a ball point or ink pen to mark an X** on the letter that represents the best answer from the choice of answers . Marks are not deducted for wrong answers.

1. A B C D 6. A B C D

2. A B C D 7. A B C D

3. A B C D 8. A B C D

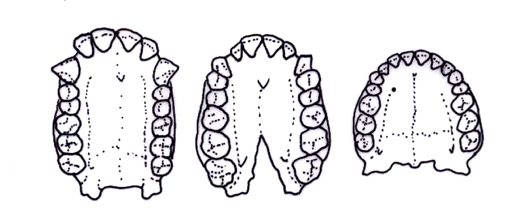
4. A B C D 9. A B C D

5. A B C D 10. A B C D

**Multi choice section**

1. Which of the following characteristics would be used MOST definitively when trying to distinguish a quadrupedal Hominid from a bipedal Hominid?
2. The length of the femur.
3. The depth of the acetabulum.
4. The presence of nails.
5. The shape of the dental arcade.
6. Tool use is providing an insight to the evolution of hominin lifestyles. Which of the following is suggested to be the main use of the Acheulian tools?
7. To build fires.
8. To groom.
9. To process meat and hides.
10. Undetermined.

Question 3 refers to the diagram below of primate dental arcades.



A B C

1. Primate dentition, including dental arcade, are suggested to have evolved due to dietary changes. The dental arcade of Primate C has a more parabolic pattern than Primate A because Primate A is:
   1. human and requires distinct gaps between the incisors and canines.
   2. an ape and requires larger molars for grinding their food.
   3. an ape and requires smaller and narrower teeth.
   4. human and requires smaller molars due to changes in diet.

Below is a list of events that occurred during primate evolution.

1. *Homo neanderthalensis* (Neanderthals) became extinct
2. First primates appear
3. *Homo sapiens* appear
4. First hominids appeared
5. First members of the genus Homo appear.
6. The correct order of events from the earliest to the most recent is:
7. iv, ii, v, i, iii.
8. ii, iv, v, i, iii.
9. iv, ii, v, iii, i.
10. ii, iv, v, iii, i.
11. Advantages of bipedal locomotion and erect stance include all except which of the following?
12. Improved heating of the body.
13. Free hands to carry food and for tool use.
14. Increased size to deter predators.
15. Increased range of vision.
16. The average brain size of *Australopithecus* species was:
17. *200 – 300cc*
18. *400 – 500cc*
19. *600 – 700cc*
20. *800 – 1000cc*
21. First evidence of ceremonial burial of dead bodies and religious belief has been found with the fossils of:
22. *Homo neanderthal*
23. *Homo sapian*
24. *Homo erectus*
25. *Homo habilis*
26. The biggest physical difference between *Homo erectus* and *Homo sapiens* is:
27. their overall height.
28. how straight their legs were.
29. the size of the brain.
30. a rounded versus pointed jaw, respectively.
31. Neanderthal was thought to be the first *Homo* species to communicate using a large variety of sounds because:
32. his large brain capacity meant he was able to construct sentences.
33. the volume of his brain meant he had the ability to process information and make a response.
34. the size of his spinal cord meant there was enough nerve attachments going to his lungs so he could speak.
35. there was a greater distance between his pharynx and his larynx.
36. Which species is incorrectly described?
37. *Australopithecus robustus* -- Lucy; bipedal hominids; ancestral to the genus *Homo*
38. *Homo erectus* -- first hominid to use fire; Old Stone Age culture
39. *Australopithecus Africanis –*bipedal hominid; ape like brain; present in Africa
40. *Homo habilis* -- first hominid known to use tools

**Short Answer Questions**

**Question One**

Humans as primates are classified in the same taxonomic family as the great apes, Hominids. The species within the family are differentiated by DNA nucleotide sequences which bring about the differences.

1. Describe the features that a species would need to have to belong to the Hominid family.

(3 marks)

***3 features eg grasping fingers and toes, pentadactyl, unspecialised limbs and body, forward facing eyes or overlapping vision, four incisors, breeding not restricted to a season, friction ridges on digits, nails instead of claws***

1. Several trends can be seen identified in the Hominid family.
2. Describe the evolutionary trends in the mobility of the fingers that can be seen in the Hominids. (2 marks)

***Increased opposability – goes from prehensile to precision grip (1)***

***Reduced length of palm (1)***

***Increased length of thumb (1)***

1. How could these trends contribute to the species survival? (2 marks)

***Ability to make tools – can manipulate environment to better survive (1 suitable reason plus explanation)***

***Increased ability to use tools for different jobs to access different foods (1 suitable reason plus explanation)***

1. As Hominids evolved their cranial capacity gradually increased. For each of the three functional areas of the cerebral cortex listed below, explain one advantage an increased brain size gave early hominins over other members of the Hominid family. (3 marks)

|  |  |
| --- | --- |
| **Functional area of the cerebral cortex** | **Advantage** |
| Motor | ***Improved muscle control for hunting, improved fine motor skills for tool making, etc*** |
| Sensory | ***Improved sensory perception for hunting, improved perception of danger.*** |
| Association | ***Improved memory of food/water sources, improved ability to plan hunts.*** |

***Answers must be relating to difference between “apes and human” concept***

**Question Two**

1. Some primates have anatomical differences that enable them to walk bipedally rather than quadrupedally. Describe two anatomical differences between a biped primate and a quadruped primate, regarding their pelvis, and outline how these features enable the primate to walk bipedally. (4 marks)

***Pelvis long and narrow in quad, broad and short in biped (1)***

***Broad enabled weight to be spread out/legs to be angled in so centre of gravity on outside of knees enabling upright stance (1)***

***Acetabulum (femur socket) allows for carrying angle to be increased in biped and reduced in quad (1)***

***This allowed for carrying angle to be directed towards the middle in biped to enable upright stance***

***Pelvis bowl shaped in biped and not bowl shaped in quad (1)***

***Pelvis bowl shaped to support organs when upright in biped, in quad pushed forward encouraging learn forward (1) can also refer to carrying infant***

***Pelvis long and narrow in quad, broad and short in biped (1)***

***Provides attachment for large buttock muscles which can move the legs and keep body erect, no such attachments on narrow hips (1)***

*(Any two differences and an explanation of why helps walk bipedally)*

1. Explain what is thought to have occurred in Africa to create a new ecological niche that was more suitable to a biped than a quadruped. (2 marks)

***The climate changed to dryer***

***Tropical rainforest died and made way for grassland***

1. Discuss four advantages that a hominin that had an erect stance and bipedal locomotion would have over a quadruped in the new ecological environment. (4 marks)

***See further to get food***

***See further to spot predators and escape***

***Carry things in their hands eg food (any suitable 4)***

***Walk longer distances to get food***

***Keep cooler as away from hot ground/exposed to wind***

***Use less energy when travelling longer distances***

***Pick food from high up***

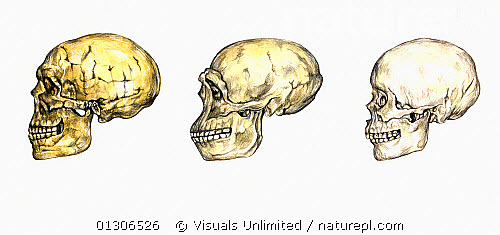
1. The press recently reported: ‘Anthropologists have uncovered ancient fossil footprints in Kenya dating back 1.5 million years, the oldest evidence that indicates our ancestors walked like present-day humans. Give two significant features of the footprints that would have led anthropologists to this conclusion. (2 marks)

***No sideways facing big toe***

***Large imprint of heel bone (any suitable 2)***

***Pressure points show heel to toe motion***

***Heel indent larger due to heel strike pressure***

**Question Three**

**A**

**C**

**B**

1. Place the skulls A, B and C in the correct order of most recent to oldest. (1 mark)

**C, A, B**

1. One of the skulls belongs to *Homo erectus.* Which skull could be erectus and explain why you make this assumption. (2 marks)

***B – jaw more protruding than D or slightly protruding, no chin formed, slight bun shape, brow ridge and zygomatic arch still robust but not hugely, sloping cranium (2 reasons)***

1. If you were to compare the postcranial skeletons of *Australopithecine Afaren*sis with *Homo erectus* describe three features you would use to identify which skeleton was which? (3 marks)

***Afarensis 1-1.5m, erectus 1.4-1.6***

***Arms long compared to legs, arms shorter compared to legs***

***Big toe sideways big toe in line***

***Curved feet two arch/flat feet***

***Narrow pelvis broad pelvis***

***(3 comparisons)***

**Question Four**

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | D |

****

The following questions refer to the tool diagrams above. The tools have not been drawn to scale.

1. Identify the tool cultures shown in the diagrams above. (2 marks)

***A - Acheulian B – Oldawan, C- Magdelanian, D – Mousterian (1/2 mark each)***

1. Explain whether the tools presented in C would be useful index fossils. (3 marks)

* ***Was only around for a short amount of time***
* ***Could therefore be used to give a relative date for another fossil***

1. Tools are not the only form of evidence that can help us formulate an idea of how these early *Homo* species lived their lives. Describe two other pieces of evidence that could be used and explain what the evidence indicates about the lifestyle of the *Homo* species. (4 marks)

***Butchery sites/piles of bones – hunt in larger groups***

***Plant remains/seeds in intestines – showed ate plants*** *(any four)*

***High C4 in bones showed ate lots of plants***

***Burnt bones – showed cooked meat/used fire***

***Remains of buildings- showed lived in shelters/stayed in one place for some time***

**Extended Response**

Alongside skeletal changes, there has been a trend of increasing cognitive abilities and lifestyles with human evolution. Describe the significance of tool development and use for hominin evolution.

(8 marks)

***Any eight (8) of the following. Focus should be on how tool development/use is connected to evolution.***

***Oldowan simple pebble tools (1) used by early Australopithecines (1) allowed exploitation of habitats (1).***

***Early homo (H. habilis) used stone tools for hunting (1) sharing of food occurred (1)***

***Homo erectus used Acheulian tools such as hand axes (1) for butchering and removing animal hides (1)***

***Homo neanderthalensis used flake tools / Mousterian (1), used to prepare animal hides and make clothes especially in the colder areas (1).***

***Homo sapiens / Modern humans made blade tools (1) allowing for***

***Aurignacian / Cro-Magnon which were used predominantly for hunting (1).***

***Solutrean ‘laurel-leaf’ little purpose, but suggests ornamental use (1)***

***Magdalenian focusing on using bone and antler as tools which were used to make other tools (1) or to make spears / hooks (1).***