

Assessment Schedule – 2023

Biology: Demonstrate understanding of trends in human evolution (91606)

Assessment Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<p><i>Demonstrate understanding</i> involves:</p> <ul style="list-style-type: none"> • using biological ideas to describe trends in human evolution. 	<p><i>Demonstrate in-depth understanding</i> involves:</p> <ul style="list-style-type: none"> • using biological ideas to explain how or why trends in human evolution occur. 	<p><i>Demonstrate comprehensive understanding</i> involves:</p> <ul style="list-style-type: none"> • linking biological ideas about trends in human evolution; and linking of ideas may involve justifying, relating, evaluating, comparing and contrasting, and analysing using scientific evidence.

Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0 – 7	8 – 13	14 – 18	19 – 24

Evidence

Question One

Evidence	Achievement	Achievement with Merit	Achievement with Excellence
<p>Bipedalism is the habitual walking on two limbs / legs. The quadruped chimpanzee has the big toe out to the side / not in alignment, whereas modern human and <i>Australopithecus</i> have an aligned big toe. This is an adaptation for bipedalism, enabling ‘push off’ or thrust, and results in greater locomotive efficiency. The chimpanzee foot, with an opposable big toe, is more suited to grasping branches in an arboreal lifestyle.</p> <p>The human foot has a defined arch, while the other two have flatter feet. The arch acts as a shock absorber, increasing efficiency of gait to allow for greater foraging distances.</p> <p>The human heelprint is deeper as humans engage in more efficient heel-toe walking.</p> <p>The climate became cooler and drier, changing forest to savannah. This was an impetus towards bipedalism as there was greater distance between resources.</p> <p>There were great changes in diet; for example, the Australopithecines were able to forage more easily on the grasslands and scavenge, and to hold a rock in order to crush or crack another item (e.g. nuts); with the new posture, they could reach high into trees for fruit, etc., and they were able to carry diet items back to a home base. Individuals who had more efficient locomotion could forage further and, therefore, obtain more resources, giving them a greater chance of survival and success.</p>	<p>Identifies:</p> <ul style="list-style-type: none"> • bipedal locomotion • one difference in foot architecture of heel / arch / toe • a second difference in foot architecture of heel / arch / toe. <p>Describes:</p> <ul style="list-style-type: none"> • the change to the leg bones due to bipedalism • how the bipedal stance would have changed diet • an example of how a varied / changed diet led to success • how the environment changed prior to bipedalism. 	<p>Explains (for early hominins):</p> <ul style="list-style-type: none"> • a difference in the foot architecture of heel / arch / toe • second difference in the foot architecture of heel / arch / toe • the change to the leg bones due to bipedalism • links between environment → bipedalism → efficiency • how diet would change with bipedalism • biped success due to diet. 	<p>Discusses, demonstrating comprehensive understanding of:</p> <ul style="list-style-type: none"> • at least two differences between the footprints, including the position of the toe, the arch, and the heel; and links the development of bipedalism to changes in climate and changes to the leg, and subsequent influence on diet / nutrition, leading to success • named changes in the diet, making links to successes and survival of bipedal hominins in the savannah / forest environment, approximately 5 million years ago.

Not Achieved		Achievement		Achievement with Merit		Achievement with Excellence	
N1	N2	A3	A4	M5	M6	E7	E8
ONE evidence point only at Achievement.	TWO evidence points only at Achievement.	THREE evidence points at Achievement.	FOUR evidence points at Achievement.	TWO evidence points at Merit.	THREE evidence points at Merit.	BOTH evidence points at Excellence, but discussion for one may be weaker.	BOTH evidence points at Excellence.

N0 = No response; no relevant evidence.

Question Two

Evidence	Achievement	Achievement with Merit	Achievement with Excellence
<p>Note: early hominins taken to mean prior to <i>Homo genus</i> as well as early <i>Homo</i>.</p> <p>The use of tools enabled early hominin to access greater food resources than had been previously available (e.g. bone marrow / nuts). This increased their chances of survival due to having more calories.</p> <p>The first tools (Oldowan) were made using a power grip where rocks were bashed together, taking just a few blows to create an edge. This single, simple tool was used for multiple purposes. The power grip enabled the rock to be gripped firmly to ensure flakes came off when the rocks were struck together. The power grip also changed access to some foods, making it possible to crush items or get into hard-to-access places, resulting in a wider range of diet.</p> <p>The precision grip meant that smaller flakes could be removed, using many more blows. This allowed for more refined / manipulated and specialised tools to be constructed, enabling early <i>Homo erectus</i> to access a wider range of resources with greater success (candidate gives examples). This had a consequent effect on brain size (positive feedback loop), leading to further refinement of tool use.</p> <p>Early hominin did not hunt for larger prey. Improved tools led to increased hunting success and, therefore, more protein in the diet, resulting in greater brain development. This enabled the success of <i>Homo erectus</i>.</p>	<p>Describes:</p> <ul style="list-style-type: none"> • what a stone tool is, i.e. something used for a purpose and used repeatedly • one benefit of tool use, e.g. digging up food / cracking open bones • a second benefit of tool use. <p>Identifies:</p> <ul style="list-style-type: none"> • power grip as allowing more force to be applied • precision grip as allowing for more precise blows to be delivered • Acheulian tools as requiring more blows / planning than Oldowan. <p>Links:</p> <ul style="list-style-type: none"> • named tool use with increased success. 	<p>Explains:</p> <ul style="list-style-type: none"> • benefit of stone tool use, e.g. defence with a found tool is better than none at all • that more specialised tools are linked to greater success, e.g. in terms of food gathering • that the increase in food from tool use enabled brain growth, which led to greater and more sophisticated tool use • advantage of precision grip to named use • advantage of power grip to named use • how success in food gathering (or other) led to brain development and species success. 	<p>Discusses, demonstrating comprehensive understanding of:</p> <ul style="list-style-type: none"> • the development in tool culture, with full understanding of both the Oldowan and Acheulean tool cultures, and connects the changes in grip with the development of more sophisticated tools • links a positive feedback loop between tools, food, and brains; therefore, more sophisticated or refined methods for tools.

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Question Three

Evidence	Achievement	Achievement with Merit	Achievement with Excellence
<p>The Out of Africa (OA) hypothesis asserts that, having evolved around 200 000–300 000 years ago, modern <i>Homo sapiens</i> left Africa (having evolved from the African erectus), and replaced the previous <i>Homo</i> species present in other parts of the world around 60 000 years ago.</p> <p>The multiregional hypothesis asserts that <i>H. erectus</i> migrated out approximately 1.5 million years ago, and <i>H. sapiens</i> arose in Europe (not in Africa) through constant gene flow of neighbouring populations.</p> <p>Humans migrated rapidly along river courses. East to west migrations were more rapid because the changes in climatic conditions were less pronounced than moving north to south. This meant that migrating peoples could take their crop species with them, which they could not do north to south.</p> <p>With abstract thought from the cerebral (frontal) cortex, <i>H. sapiens</i> were able to solve problems and be creative (including thinking ahead in time). Clear development of the Broca’s and Wernicke’s areas of the brain would also have contributed to the development of better food-gathering skills, for example: transport due to better skills for raft-building; better shelter design, especially when lifestyle became less nomadic; and different opportunities for food sources, e.g. fishing, better team work when hunting larger animals.</p>	<p>Describes:</p> <ul style="list-style-type: none"> • OOA hypothesis • multiregional hypothesis • human migration along rivers, etc. • advantage of abstract thought • Broca’s or Wernicke’s area • plausible reason for difference in travel time. 	<p>Explains:</p> <ul style="list-style-type: none"> • the difference between OOA and multiregional hypotheses • why east to west migration was more rapid than north to south • why south to north migration was not as rapid due to terrain • how abstract thought can be linked to shelter • how abstract thought can be linked to food gathering • how abstract thought links to migration route / success • another area of brain development, linked to diet or shelter. 	<p>Discusses, demonstrating comprehensive understanding of the dispersal theory:</p> <ul style="list-style-type: none"> • success in <i>Homo sapiens</i>, through an evaluation of how brain development and abstract thought would have led to successful migration due to good and varied shelter, diet (different foods in different areas), and communication • gives reason(s) for why migration to some areas would be faster than to others, e.g. food gathering, climate, raft building.

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