

Assessment Schedule – 2011

Biology: Describe trends in human evolution (90719)

Assessment Criteria

QUESTION ONE

Achievement	Achievement with Merit	Achievement with Excellence
<p>Describes features for bipedalism and arboreal life or explains one, Eg:</p> <ul style="list-style-type: none"> • Long arms (arboreal) • Valgus angle in femur (bipedal). • Foramen magnum centred <u>under</u> skull (bipedal) • Reduced nuchal crest (bipedal) • Divergent big toe (arboreal) • Grasping feet (arboreal) <p>Describes key aspects of bipedalism. Eg:</p> <ul style="list-style-type: none"> • More efficient walking means that <i>Ardi</i> could <u>cover longer distances</u>. • Hands free to carry things. • Height advantage means that <i>Ardi</i> could see further – water, food, predators, etc. • Less exposure to Sun because of upright stance. <p>(Any TWO ideas)</p>	<p>Explains how skeleton gives evidence for ONE feature. Eg:</p> <ul style="list-style-type: none"> • <i>Ardi</i> has long arms indicating efficient brachiating through trees. • The valgus angle in her femur to bring feet / knees beneath hips / directly below the centre of gravity thus indicating bipedalism. • The valgus angle – greater stability when <u>walking</u> bipedally • Foramen magnum under skull showing spine was vertical indicates bipedalism • Reduced nuchal crest means less neck muscles to hold head up indicates bipedalism • Divergent big toe – for grasping branches <p>Explains how changes affected <i>Ardi</i>'s way of life (ONE idea). Eg:</p> <ul style="list-style-type: none"> • <i>Ardi</i> can cover more distance to <u>gather more resources</u> as bipedal locomotion is more efficient. • <i>Ardi's</i> height makes her more visible to predators (vulnerability implied) • Upright: Less likelihood of overheating when <u>walking in the open</u> / doing other activities • The changing climate means that <i>Ardipithecus</i>' niche is diminished, forcing her to leave the trees. • As bipedalism leaves her hands free, <i>Ardi</i> can carry resources from place to place, giving her a survival advantage. 	<p>Discussion of advantages (at least TWO) of bipedalism in the changing climate outweigh the cons (at least ONE). Overall, bipedalism's advantages must have been more significant, or it would not have been selected for.</p> <p>Eg, most of:</p> <p>As the climate changed and less forest was available, <i>Ardi</i> would have had to walk further to gather food. Longer legs and straighter spine for bipedalism gave a height advantage, allowing <i>Ardi</i> to be able to see further, allowing her to find resources more easily. However, being taller might have made her more visible to predators. In addition having hands free means that she could carry items such as tools for gathering more food, or food from another place to consume at a later date.</p> <p>However, changes to bipedalism make <i>Ardi</i> less well adapted for arboreal life, potentially reducing protection and food gathering.</p>

QUESTION TWO

Achievement	Achievement with Merit	Achievement with Excellence
<p>Describes domestication OR cultural evolution <i>Domestication:</i></p> <ul style="list-style-type: none"> • Using local plants and animals for increased / regular / stable food supply. • Climate change / end of ice age / increase in moisture meant that crops could be farmed. <p><i>Cultural evolution:</i></p> <ul style="list-style-type: none"> • Learned behaviour / knowledge / ideas that are passed on through generations <p>OR</p> <p>Describes benefit:</p> <ul style="list-style-type: none"> • did not need to move for food • more available food (*can only be used once) • bigger populations • more specialised tools • specialisation of labour OR farm-type occupation • trade / bartering. <p>OR</p> <p>Describes disadvantage:</p> <ul style="list-style-type: none"> • increase in diseases • attracts pests • waste disposal • ownership disputes • reliant on few crops • seasonal boom / bust • reduced variation in diet <p>One way of overcoming:</p> <ul style="list-style-type: none"> • food storage – pottery • trade / economics. 	<p>Explains ONE aspect of how agriculture increased cultural development,</p> <p>Eg:</p> <ul style="list-style-type: none"> • Domestication happened, using crops and animals from the local environment, and adapting them to provide regular food supply for a group of individuals. • Climate warming meant that agriculture appeared suddenly in many places as crops could be grown there [<i>change</i>]. This meant that people did not need to move to gather food, so could conserve energy and support larger populations [<i>advantage</i>]. • With more food available, larger populations could be supported [<i>advantage</i>]. However, this meant that there was more waste to deal with, potentially bringing pests and diseases [<i>disadvantage</i>]. • With crops being harvested at one point in time, food supply would be erratic through the year [<i>disadvantage</i>]. New technologies such as pottery containers for food storage would have been one solution to this [<i>solution</i>]. • With domestication of crops came a reduction in the variety of food available compared to hunter-gathering. {<i>disadvantage</i>}. Trading between different groups gave greater food variety {<i>solution</i>} 	<p>Discussion linking domestication to the ability to plant crops and subsequent benefits of sedentary life.</p> <p>At least TWO points linked.</p> <p>Eg:</p> <ul style="list-style-type: none"> • Domestication allowed individuals to use crops and animals from the local environment, adapting them to provide regular food supply to enable development of stable settlements. • Climate warming meant that agriculture appeared suddenly in many places as crops could be grown there [<i>change</i>]. This meant that people did not need to move to gather food, so could conserve energy and support larger populations [<i>advantage</i>]. With crops being harvested at one point in time, food supply would be erratic through the year [<i>disadvantage</i>]. Food supplies might be damaged or unusable [<i>disadvantage</i>]. New technologies such as pottery containers for food storage or shelters for food from extreme weather would have been two solutions to this [<i>solutions</i>].

QUESTION THREE

Achievement	Achievement with Merit	Achievement with Excellence
<p>Describes TWO tool cultures from the given time periods: Eg:</p> <ul style="list-style-type: none"> • Acheulean – bifacial, tear-drop shaped, flaked, hand axes for chopping / scraping (butchering food). • Mousterian – made from flakes, re-sharpened edges, Levallois method; scrapers & spears, attached stone tools to handles, flint. • Palaeolithic – specialised, made from several materials (flint & bone), precision / refined / intricate, fine blades & points; spear thrower, bone needles, fish hooks, wide range of uses <p>Description could be:</p> <ul style="list-style-type: none"> • structure • purpose • example. 	<p>Explains how the tool culture has changed in manufacture and / or design between all THREE of the given periods.</p> <ul style="list-style-type: none"> • Cover all three cultures • At least FOUR points explained <p>Eg: Tools have progressed from the basic removal of stone flakes to create tear-drop shaped hand axes in the Acheulean culture. Next was the Mousterian culture where the Levallois method was used to remove a sharp-edged flake of stone. Lastly came the finer detailed Palaeolithic tools such as needles and hooks made from bone and flint.</p>	
<p>Describes a reason for using mtDNA evidence. Eg: mtDNA is not affected by meiosis.</p> <p>OR</p> <p>mtDNA mutations happen at a steady rate. OR</p> <p>mtDNA can be used to identify common ancestors via mother-child inheritance.</p> <p>OR</p> <p>mtDNA is genetically stable compared to nuclear DNA</p> <p>OR</p> <p>Describes the Out of Africa dispersal model Eg: Modern humans / <i>H. sapiens</i> moved out of Africa (approx 70 000 years ago), <u>replacing</u> (<i>H. erectus</i> and <i>H. neanderthalensis</i>).</p> <p>OR</p> <p>Describe a reason for more diversity in modern African <i>H. sapiens</i> populations Eg: The modern <i>H. sapiens</i> population is older / has had longer time to develop</p> <p>OR has undergone founder effect / bottleneck effect</p>	<p>Explains why mtDNA evidence was used to support the Out of Africa model. Eg:</p> <ul style="list-style-type: none"> • mtDNA has been used because it is passed on from mother to child and is not changed due to meiosis. OR • Mutations occur at a steady rate in mtDNA and can be used to estimate how long ago two species shared a common ancestor. <p>OR</p> <p>Explains about the variability in genetic diversity of <i>H. sapiens</i>. Eg:</p> <ul style="list-style-type: none"> • The greatest variability is found within African populations which are the oldest. There is less genetic diversity in Asian and European populations, which suggests they are not as old as African populations. <p>OR</p> <ul style="list-style-type: none"> • There is less genetic variability in European / Asian populations because only a very small number of early human left Africa and therefore they would have reduced alleles / genetic diversity. 	<p>Discusses the Out of Africa dispersal model and the evidence that supports it. (TWO points needed)</p> <ul style="list-style-type: none"> • mtDNA has been used because it is passed on from mother to child and is not changed due to meiosis. <p>OR</p> <ul style="list-style-type: none"> • Mutations occur at a steady rate in mtDNA and can be used to estimate how long ago two species shared a common ancestor. <p>OR</p> <ul style="list-style-type: none"> • Populations inside Africa show greater variability than other populations, which is to be expected, as they were the first modern humans, they have had a longer time to develop greater diversity. <p>OR</p> <ul style="list-style-type: none"> • Founder / bottleneck effect explained (as per 'Merit' column) <p>OR</p> <ul style="list-style-type: none"> • All people alive today (and living outside of Africa) can be traced through their mtDNA to one of a small group of women living in Africa (about 170 000 years ago).

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Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
2 A	2 M	2 E