Assessment Schedule – 2010

Biology: Describe trends in human evolution (90719)

Evidence Statement

Q	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)	**Describes biological and cultural evolution.** Eg biological evolution is the transmission / passing on / evolution of genetic information (from parent to offspring) OR Cultural evolution is the transmission / passing on / evolution of learned behaviour / ideas / knowledge / non-genetic information		
(b)	**Gives a reason why biological evolution is slower OR cultural evolution is faster.** Eg cultural evolution can happen within a lifetime / generation. OR Biological evolution can happen only once from generation to generation / occurs over many **generations** (or similar).	**Explains why cultural evolution is much faster than biological evolution, comparing the two processes.** Eg cultural evolution can happen within a lifetime / generation. AND Biological evolution can happen only once from generation to generation / occurs over many generations. (or similar).	

(c)	**TWO examples of scientific evidence identifying trends in cultural or biological evolution are described.** Note that trends should relate to Neandertal (accept early Homo sapiens). Biological Eg. The skeletal remains will produce evidence of body shape / size / type. (NOT for bipedalism) The skull will provide evidence of brain size / organisation. The skull will provide evidence of diet. The bones could be analysed for DNA sequences Cultural Eg the skeleton has been buried in a purpose made grave, in a specific way, providing evidence of burial. The existence of "worked" fragments provides evidence of a type of tool making. The existence of fire places provides evidence of fire use Large animal bones provides evidence of group hunting	**Examples of scientific evidence identifying biological AND cultural evolution are identified and how at least TWO piece of evidence can be used to identify a trend is explained.** Biological – (ONE) The cranial capacity and shape of the skull can indicate ability for speech / language / tool making ability / high intelligence *(must have consequence of high intelligence)*. The (reduction in) sagittal crest / zygomatic arch / jaw size / tooth shape or size can indicate dietary change / cooked food DNA analysis could indicate how closely related the bone / fossil is to other fossils Cultural – (ONE) The way in which the skeleton has been buried can indicate the development of spititual beliefs / greater level of care / sign of respect The material used and the method used in making the 'worked' fragments can indicate learned / cooperative behaviour / foresight / planning. The presence of fire places can indicate a trend towards cooking food / dietary changes The presence of large animal bones can indicate cooperative behaviour / communication / planning	**Examples of scientific evidence identifying biological and cultural evolution AND how the evidence can be used to identify trends in both is fully discussed.** Eg the way the skeleton has been buried can be compared to other burial sites of the same age to identify significant similarities in the evolution of spiritual beliefs and care for the dead. The production of and the material used in the 'worked' fragments can be compared to sites of the same age, to establish a broader understanding about a particular tool culture. Charcoal from the fire places and skeletal bone can be dated using radiocarbon techniques, as the site is likely to be Neandertal or archaic Homo sapiens and therefore not older than 50,000 years, for which radiocarbon dating can be used. The skull detail, such as cranial capacity, DNA and age can be analysed and compared to others of similar age and / or genus, to confirm existing evidence or identify new trends / variations in biological evolution of Neandertal.
Suff	2 × a	1 × a + 1 × m	1 × a + 1 × e
TWO (a)	**Describes Oldowan tools as less sophisticated / less refined / fashioned on one side only compared to Acheulian tools which are more sophisticated / more refined / bifacial.**	**Explains how Oldowan tools compare to Acheulian tools in their design AND manufacture.** Eg Oldowan tools are **pebbles** with a **few flakes** removed from one side. AND Acheulian tools appear to have a **tear-drop shape**, made with greater precision and many more finer blows to remove more flakes to produce specific shapes such as the **hand axe**. Acheulian tools required more planning to make and more stages in their manufacture.	

(b)	**Describes TWO items of evidence from the fossil data** Eg *H. erectus* found at sites outside of Africa, in Asia. *H.erectus* has larger cranial capacity than other hominins believed to be around at the same time or earlier. *H.erectus* fossil sites show evidence of Acheulian tools. *H.erectus* fossil sites show evidence of the use of fire.	**Uses TWO items of evidence from the fossil data and links it to the ability of *H. erectus* to survive outside of Africa and describes ONE conflicting item of evidence OR discusses TWO items of data that conflicts with evidence that *H. erectus* was first to leave Africa.** Eg *H. erectus* skulls show increased cranial capacity and fossil sites a more advanced Acheulian tool culture, which would have been better for hunting and scavenging. *H. erectus* skulls show increased cranial capacity indicating better communication / planning / cooperation leading to improved chances of survival. *H. erectus* have more advanced Acheulian tools therefore would have had the ability to access meat as a supply of additional calories / energy. *H erectus* used fire – able to keep warm in cooler regions / Use of fire lead to better / stronger tools → more successful hunting and increased food / Use of fire to cook food / meat to access additional protein / energy / Use of fire as protection from predatory animals. AND Desribes ONE conflicting item of evidence (see below) OR (TWO items) Conflicting evidence about being the first hominin to leave Africa comes from Georgia (Europe / Asia) where a species, named *H. georgicus*, dated earlier than *H. erectus* 1.6-1.7 mya), with a cranial capacity of only 600-780cm^3 and associated with Oldowan tools has been found. *H. georgicus* is not associated with fire or the ability to produce the more advanced tool culture for accessing high protein food, thought necessary to survive outside of Africa.	**Discusses TWO items of evidence from the fossil data, linking it to the ability of *H. erectus* to survive outside of Africa AND discusses TWO items of evidence that conflicts with the view that *H. erectus* was the first to leave Africa.** Eg *H. erectus* skulls show increased cranial capacity and fossil sites a more advanced Acheulian tool culture, which would have been better for hunting and scavenging. *H. erectus* skulls show increased cranial capacity indicating better communication / planning / cooperation leading to improved chances of survival. *H. erectus* have more advanced Acheulian tools therefore would have had the ability to access meat as a supply of additional calories / energy. *H erectus* used fire – able to keep warm in cooler regions / spend time making tools for hunting or processing meat at a home base / Use of fire lead to better / stronger tools → more successful hunting and increased food. *(Additional evidence may be introduced, not given on the table, to support discussion and should be accepted provided it is correct).* AND Conflicting evidence about being the first hominin to leave Africa comes from Georgia (Europe / Asia) where a species, named *H. georgicus*, dated earlier than *H. erectus* 1.6-1.7 mya), with a cranial capacity of only 600-780 cm^3 and associated with Oldowan tools has been found. *H. georgicus* is not associated with fire or the ability to produce the more advanced tool culture for accessing high protein food, thought necessary to survive outside of Africa.
Suff	2 × a	1 × m	1 × e

THREE (a)	**Skull structures relating to mode of locomotion are identified for each species. Eg centralised foramen magnum or nuchal crest.** **(TWO)** Eg: • Foramen magnum at **back** – gorilla is quadrupedal / knuckle-walker • Foramen magnum more (centred) / forward – *Australopithecus* is mostly bipedal. • Foramen magnum is centred **under** the skull – *H sapiens* is bipedal. (NOT middle of skull)	**Trends in skull structure. Eg centralised foramen magnum AND nuchal crest are linked to the mode of locomotion for each species, to explain how they assist in movement.** **(THREE)** Eg: • Foramen magnum at back,– gorilla is quadrupedal and relies on **nuchal crest / neck muscles** to keep head upright. • Foramen magnum more forward – *Australopithecus* is mostly bipedal but relies on nuchal crest / neck muscles to keep head upright. • Foramen magnum is centred under the skull – *H sapiens* is fully bipedal with head balanced on spine.	
(b)	**The relationship is described.** Eg as body height increases, brain size increases (OR vice versa).	**The relationship is explained.** Eg as body height increases, brain size increases (OR vice versa). AND **A link to other biological development trends is made.** Eg increased endocranial capacity is linked to the ability to make speech and understand sounds. / Eg A change in diet to meat provided greater protein / energy which lead to increased brain developmen OR **Increased endocranial capacity is linked to the development of bipedalism.** Eg pipedalism freed hands so tools could be used to obtain "better" food.	**The relationship is discussed and linked to other trends in biological development in hominins.** Eg as body height increases, brain size increases (OR vice versa) (as each genus has become more complex in its development). AND **The importance of bipedalism is identified and discussed.** Eg bipedalism freed the hands which enabled hominins to develop tools, which have in turn enabled them to access meat, which is rich in protein and energy needed to increase brain development and therefore endocranial capacity, leading to development of speech, understanding and conceptual thought (Broca's, Wernickes and increased cerebrum). OR Bipedalism also freed the hands to allow for tool development and learning of more complex skills, and therefore selection for larger brains, requiring increased endocranial capacity.
Suff	1 × a	1 × m	1 × e

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
2 **A**	2 **M**	1 **M** + 1 **E**