Human Biological Sciences 3A/3B

Extended Response

Human Evolution

ANSWERS

(30 marks)

1. Brain size (8 marks – max 4 for a or b)

a)

* Total brain size increases (must quote figures) 400cc 🡪 1300cc or relative to body size
* Cerebral cortex increases
* Frontal lobe 33% 🡪47%
* Convolutions increase in number
* Increase visual interpretation part increases and smell area decreases
* Development of speech and language parts – Broccas and Wernickes areas

b)

* Cerebral cortex is thinking, reasoning, planning and processing
* Tool use developed necessity to use this area
* Diet of meat allowed energy for growth of larger brain
* Larger brain enabled social groups
* Collaborative hunting
* Language provided advantage for above developments

1. Teeth (8 marks – max 4 for a or b)

a)

* Reduction of canine teeth
* Smaller teeth
* Less teeth 36 -> 32
* U shaped dental arcade to parabolic shape
* Reduced prognathism
* Increased enamel thickness
* Chin

b)

* Diet change from plants -> meat
* Tool use allowed to be killed and cut up
* Fire allowed cooking to soften meat and tough plant matter
* Better vision from flatter face
* Balance from reduced jaw
* Speech from more room in mouth

1. Feet (8 marks – max 4 for a or b)

a)

* Heel bone
* Arches – longitudinal and transverse (unique to humans)
* Big toe in line with others
* Loss of opposability of big toe
* Short toes

b)

* Upright stance
* Bipedalism
* Rolling step of arches allows striding gait and running
* Rigid feet and heel bone allow balance and centre of gravity
* Energy saving of walking vs knuckle walking
* Heel allows balance
* Big toe allows push off

1. Agriculture (6 marks – max 3 for a or b)

a)

* Planting and haresting of grasses
* Domestication of animals
* Permanent home base
* Storage of food from season to season
* Early man were hunters and gatherers

b)

* Cultivation allowed permanent home base
* Buildings
* Pottery
* Ensured food supply for longer life
* Sense of community
* More children – population increase
* Art and culture developed in spare time
* Tools allowed farming
* Trade
* Varied diet