3

91606

916060

NZQA
NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
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SUPERVISOR'S USE ONLY

Level 3 Biology, 2015

91606 Demonstrate understanding of trends in human evolution

2.00 p.m. Monday 23 November 2015
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of trends in human evolution.	Demonstrate in-depth understanding of trends in human evolution.	Demonstrate comprehensive understanding of trends in human evolution.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

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Low Achievement

TOTAL 8

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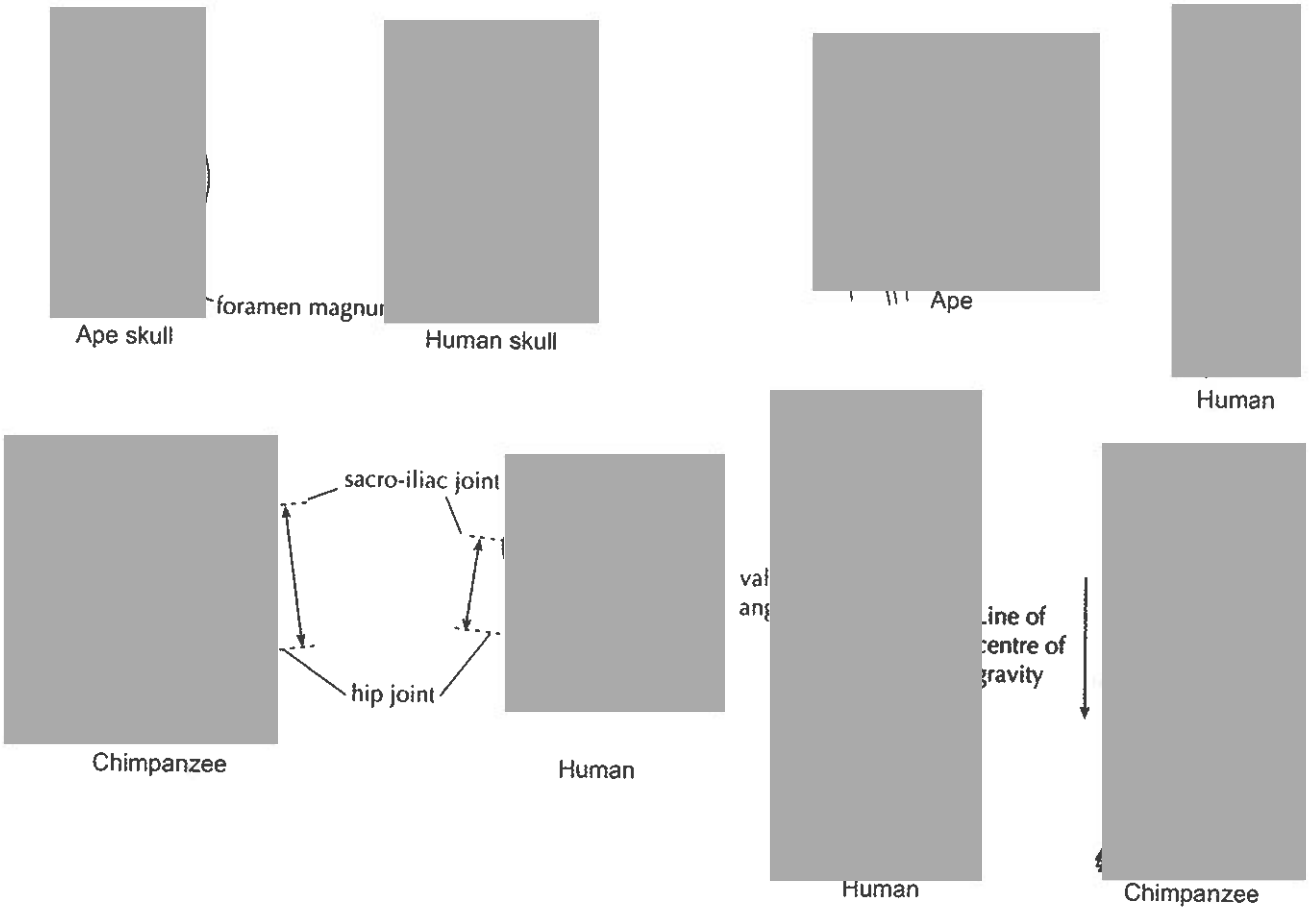
QUESTION ONE

A distinguishing feature of hominins is habitual bipedalism. Comparisons of skeletal features of modern humans and extant (living) hominids such as the gorilla or chimpanzee, reveal several key features that are associated with the transition from quadrupedal species to bipedal species.

Some of the most important features are shown below.



Adapted from: Anna Roberts & Maria Sinclair, *ESA Study Guide: Level 3 Biology* (Auckland: ESA Publications (NZ) Ltd, 2013), pp 275–277

Discuss the importance of bipedalism in the development of hominins by linking the skeletal features to their adaptive significance.

In your answer:

- describe what is meant by the terms quadruped and biped
- explain how any three of the skeletal features (shown above) provide evidence for the form of locomotion changing to bipedalism
- justify why bipedalism was so significant to the evolution of hominins.

Quadripedals walked/moved on four limbs, whereas bipedals moved on two limbs. The form changed from a locomotion of quadripedalism, a C shaped spine to an upright S shaped spine for bipedalism

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(1) The foramen ~~beer~~ magnum became more centralised in the human skull. because the mode of locomotion became more upright and skull was more forward facing.

(2) The chimpanzee had different leg limb structure, with humans now being knock-kneed with the valgus angle, and the centre of gravity is placed differently.

(3) Apes had an overarching C shaped spine, which meant it was bent and hunched over, while the human has an S shaped spine to be more upright and forward facing. Bipedalism was significant to evolution of hominins. Because it was upright and forward facing, bipeds could move on two feet. This meant they were less exposed to light, so light exposure decreased and they spent less energy. This meant they were generally taller and could see predators from further away, increasing survival chances. This means their populated habitats changed as well, they become more accustomed to different lifestyles. Wernickes area and broca's are enlarged because of the skull placement. ~~Theef~~ Therefore, it is energy conservative and increases survival.

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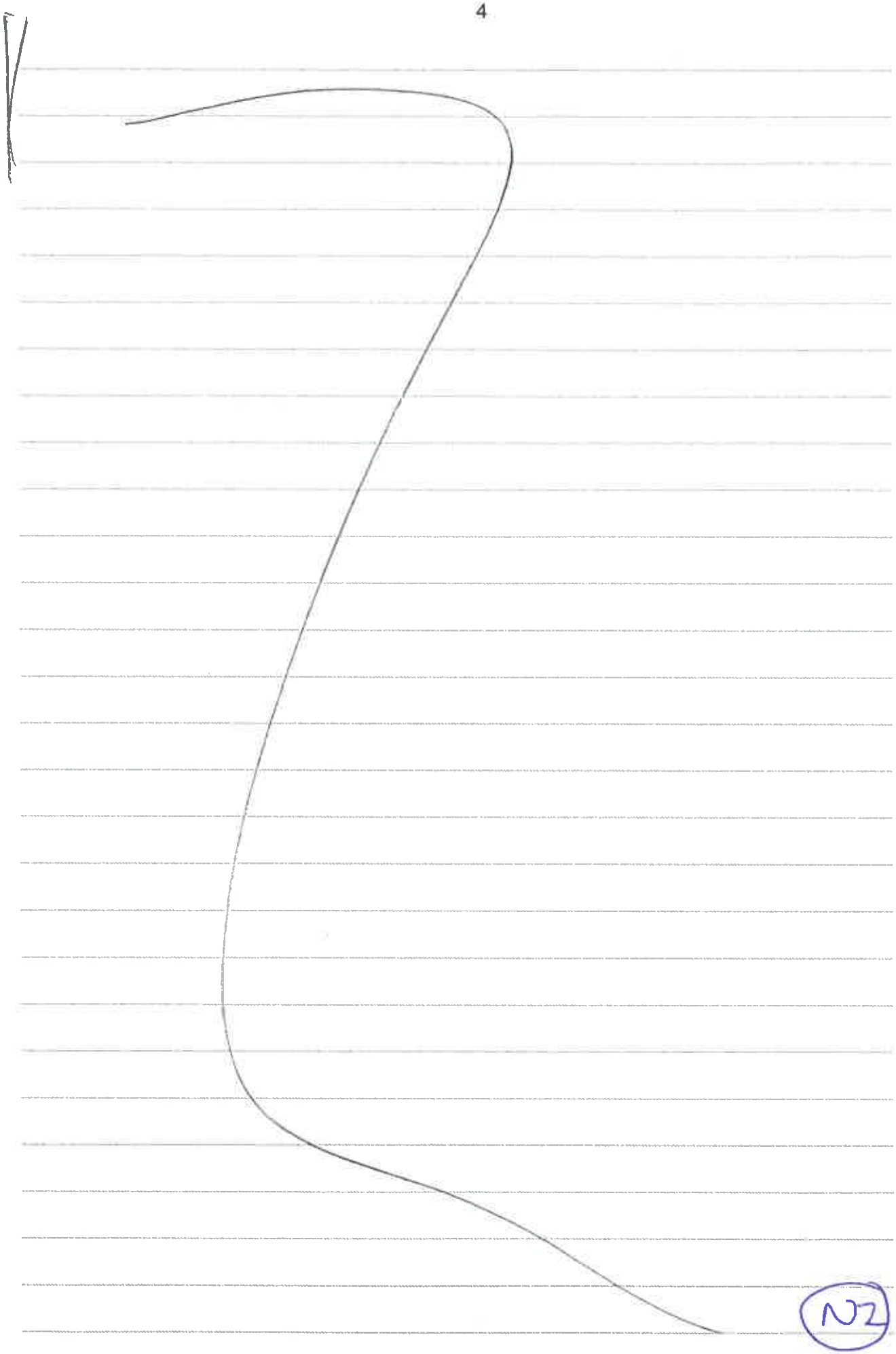

N2

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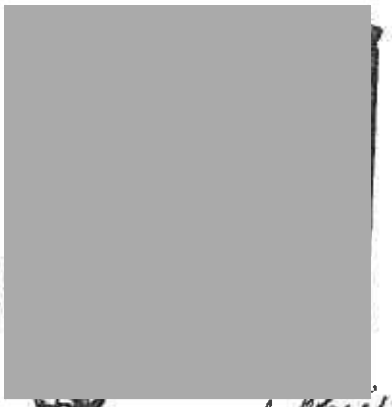
N2

QUESTION TWO

ASSESSOR'S USE ONLY

Tool Culture Figure 1	Tool Culture Figure 2	Tool Culture Figure 3
 neanderthalensis		 Aculean homo habilis
http://zinken.typepad.com/palaeo/images oldowean	https://en.wikipedia.org/wiki/Stone_tool#/media	https://upload.wikimedia.org/wikipedia/commons/8/89

The advance of the use of tools and fire had many effects on the evolution of hominins.

Discuss the likely impacts that the different tools and fire had on the different hominin species, and the evolutionary trends that can be linked to these developments.

In your answer:

- identify the three tool cultures as shown in the diagrams above, and link a species of hominin to each tool type (?)
- explain the trends shown in the development of the tool cultures above, and how this shows a progression in the cultural evolution of the hominins
- discuss the likely effects that fire and the use and development of tools had on the biological evolution of the hominins.

The trends shown in development of tool cultures is that they became more developed over time. Figure 1. shows quite jagged sides, with Figure 2. having a smooth end and a large part of raw rock cut out. Figure 3 shows a tool that is fully jagged and sharp, suitable for cutting fibrous materials. This shows a progression because the materials used for each figure are developed and stronger. The size of the tools generally increased as well, accounting for the fact that hominins found better uses. The Figure 1. is likely oldewean used by neanderthalensis(?) and Figure 3 is aculean by homo habilis (?)

There is more space for your answer to this question on the following page.

The development of tools meant more uses for tools as they developed. The use of fire was a major change, scientifically believed to have been started by homo erectus. This biologically changed them because fire did many things. It killed parasites on meat, decreasing sickness. It tenderised meat so the jaw was used less in labour so biologically jaws were changed. This meant food was more pallatable and also meat was eaten faster, so there was greater energy taken so biologically, the hominins had more energy to conserve. This changed their biological evolution, because the tools meant that more creatures could be killed, they could prepare food better, to be cooked and eaten, causing these biological changes, as well as the growth of the Brocas and Wernickes areas.

N2

N2

QUESTION THREE

ASSESSOR'S USE ONLY

http://madamepickwickartblog.com/wp-content/uploads/2012/01/cannibal4.jpg

http://io9.com/how-farming-almost-destroyed-human-civilization-1659734601

One of the most important milestones in human evolution was the transition from hunter-gatherer to agriculture or farming. Scientists have concluded that it is likely that the transition to farming was due to migration and replacement of existing populations, and not due to cultural transmission from farmers to hunter-gatherer populations.

Discuss the cultural trends and any advantages and disadvantages a transition from hunter-gatherer to agriculture involved.

In your answer you should:

- describe the lifestyle of a hunter-gatherer and the lifestyle of an early farmer
- explain the cultural trends involved in the transition from hunter-gatherer to agriculture
- discuss any advantages and disadvantages a transition to agriculture from hunter-gatherer involved.

The life style of the hunter gatherer was that the group of humans would (co-operatively) move around with their prey, targeting them so they had good food sources.
The life style of the early farmer was that the people had domesticated animals for food sources and was able to grow crops. This was done in one place, usually one that was closer to water supplies etc.
Cultural trends involved mostly the change from co-operative moving parties into domesticated communities with agriculture and farming came groups living in permanent housing and farms.
This was likely caused by migration, because humans follow

There is more space for your answer to this question on the following page.

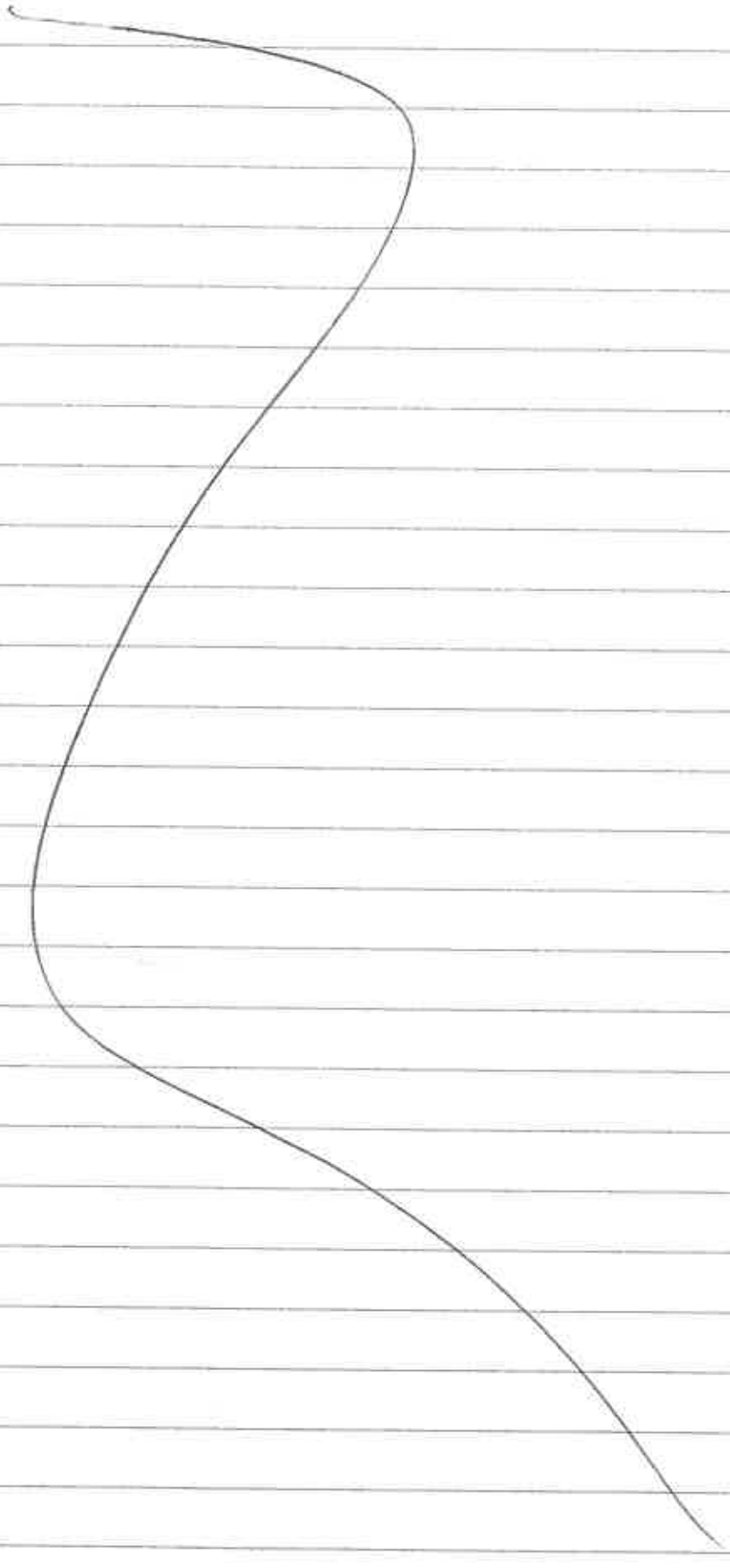
their prey out of their areas, or as they moved on their own migration path. This cultural trend is that as more was learned and people thought more intelligently they decided to settle and keep their prey where they lived, rather than chasing themselves. Gathering became obsolete because of the ability to grow crops so they didn't need to gather plants. The advantages were an increase in cultural communities, a dominance of the domesticated lifestyle and that energy was conserved because there was not a constant hunting lifestyle, instead food was near and could be killed easily, saving energy for other means. Disadvantages involved would be that it was a hefty, time consuming process getting communities to work together at different tasks for agriculture such as cow milking and crop harvests. But the energy conserved above could be used here. Therefore the biggest advantage is the permanent placement.

A4

Extra paper if required.
Write the question number(s) if applicable.

QUESTION NUMBER

ASSESSOR'S USE ONLY



Low Achievement exemplar for 91606 2015		Total score	08
Q	**Grade score**	**Annotation**	
1	N2	This question provides evidence towards N2 by describing the difference between biped and quadruped and identifying three skeletal features associated with bipedalism.	
2	N2	The candidate identified Homo erectus as the first species associated with fire and described an effect of fire.	
3	A4	This candidate described the settled agricultural lifestyle of a farmer and implied the nomadic lifestyle of the hunter-gatherer. In addition the more reliable supply of food was described.	

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Achievement

TOTAL 10

ASSESSOR'S USE ONLY

femur

bulresse knee joint - Supresses shock

QUESTION ONE

ASSESSOR'S USE ONLY

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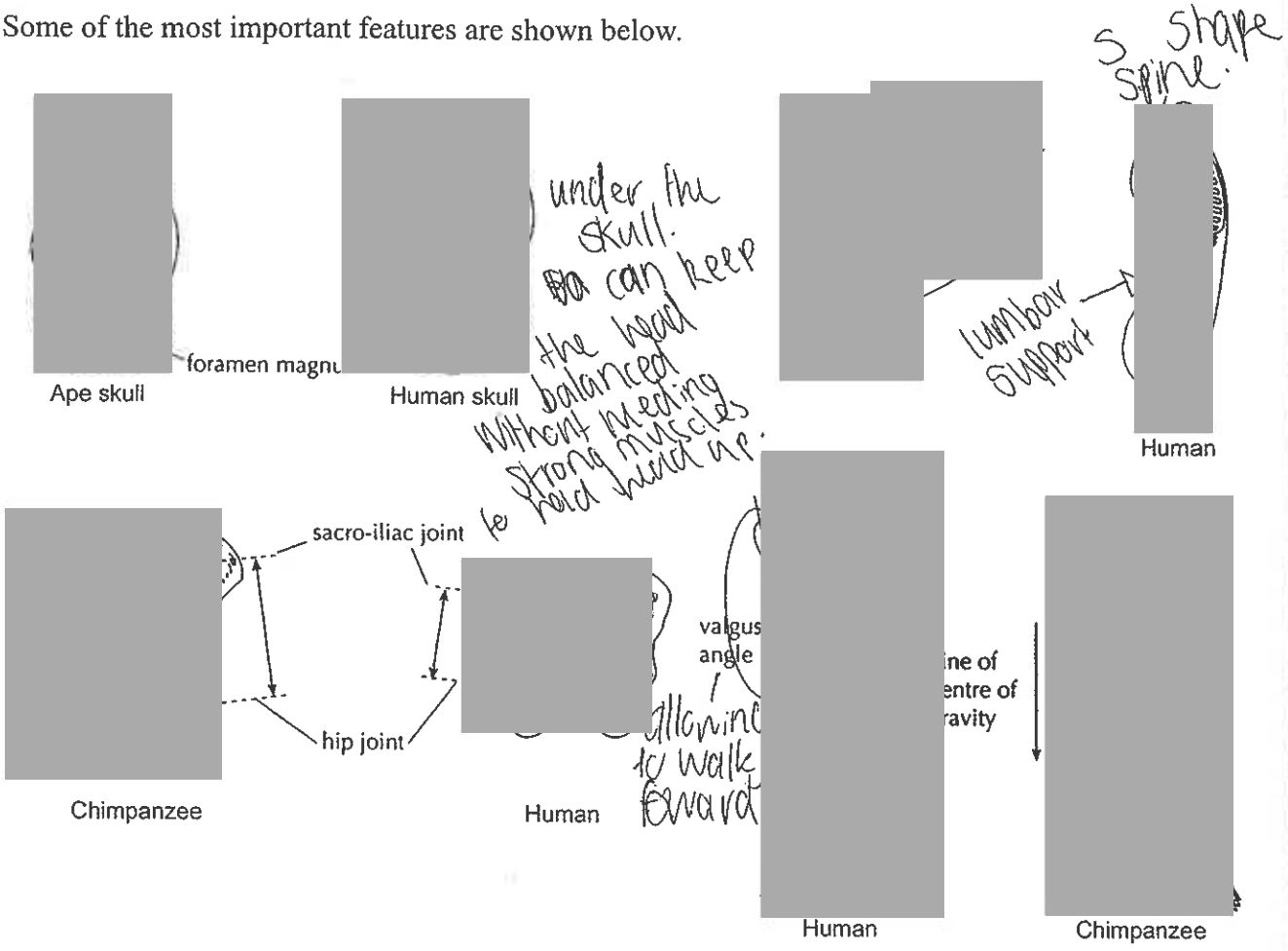

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In your answer:

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- justify why bipedalism was so significant to the evolution of hominins.

see prey thermoregulation energy carry stuff & infants

wider hips & pelvis - bigger brain bc bigger brains babies

- Quadruped is the term used to describe someone walking on all fours, such as arms and legs and is seen in hominids. Biped is when you walk on only two legs and is seen in hominins.

ASSESSOR'S USE ONLY

- The foramen magnum is the socket in which the spinal cord comes from the skull. Over time it changed from being at the back of the skull to now under the skull. This provides evidence of bipedalism evolving because the placement of the foramen magnum allows for the spinal cord to be vertical so a human can stand upright and also means the skull can now be kept balanced without needing strong muscles to hold the head up. Another feature which provides evidence of bipedalism was the change in the valgus angle. Because this angled changed it meant bipedalism could occur as it allowed hominins to walk forward. The shape of the spine evolved into a 'S shaped' spine. This meant a lumbar support region of the spine was developed which contributed to the spine staying upright and therefore resulting in bipedalism. evidence for locomotion changing to bipedalism. The butresse knee joint evolved, which supresses shock when walking on two legs and so provides evidence of bipedalism.
- As hominins began to walk on two legs it meant that prey could be spotted from a further distance. So this made

There is more space for your answer to this question on the following page.

more people get fed.

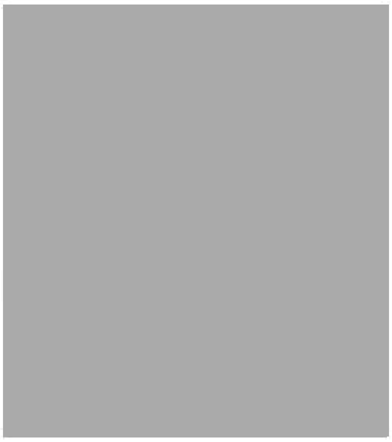
much easier because their height advantage meant they could see more into the distance. this would of made hunting much more efficient and wouldn't be wasting as much energy on hunting compared to if they were quadrupedal. Bipedalism meant hips became wider so the pelvis became bigger which resulted in babies ~~had had bigger~~ could now be born which had bigger brains, so was significant in the evolution of humans because they were becoming more knowledgable with larger brain sizes. Less energy is used with bipedalism as their is now less surface area so they wont absord as much heat from the sun and thermoregulation can occury much easier. Hominins could now hunt and run for longer as they wouldn't of heated up and often tired as fast as being quadrupedal. ~~Bipedalism~~ Bipedalism meant hands were free so could carry tools, infants and food. This ~~contributed~~ was significant to the evolution of humans because food which was hunted could be carried back to people who are too young to hunt so therefore more people feed.

(3)

oldowana

neadathals
h.sapiens
h. habilis
h. erectus

QUESTION TWO

Tool Culture Figure 1	Tool Culture Figure 2	Tool Culture Figure 3
		
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In your answer:

- identify the three tool cultures as shown in the diagrams above, and link a species of hominin to each tool type
- explain the trends shown in the development of the tool cultures above, and how this shows a progression in the cultural evolution of the hominins · creativity & imagination
- discuss the likely effects that fire and the use and development of tools had on the biological evolution of the hominins. (fire, food softer, jaw, teeth could become smaller as less muscles involved)

Tool culture of figure 2 was the earliest tools and were invented by Homo habilis and these were oldowan tools. Figure 3 tools were from homo erectus and Figure 1 tools were developed from neandathals and Homo sapiens. H. habilis tools started as a rock with one end that had been cut but over time evolved and became more shaped. They also became more specific for certain tasks, such as needles for sewing clothes. These developments in the tools shows the progression in the cultural evolution

There is more space for your answer to this question on the following page.

for ~~homor~~ hominin because it meant that creativity and imagination would of had to occured. Different rocks were better than others and this would of come down to trailing ~~the~~ rocks to know which ones were best to use.

- Fire had effects on the biological evolution of the hominins because fire meant meat could be cooked. By cooking meat, it meant the meat was softer and so the jaw became smaller as the larger muscles around it were now unessacary for chewing tough meats. The teeth became smaller and the molars became smaller as chewing soft meat didn't need big sharp teeth.

Fire meant tools could become sharp and hard at one end so the spear was developed. This spear meant that instead of hominins having to run after their prey they could now throw a spear at the prey. This could of resulted in a biological change in the hominins from tools because muscles could of become smaller as they weren't being used as much as they use to.

(Q3)

QUESTION THREE

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- discuss any advantages and disadvantages a transition to agriculture from hunter-gatherer involved.

the lifestyle of a hunter-gatherer would have been one which they would of had to move around and change camp a lot. this could of been due to the fact that once they had hunted in a specific area they would of had to move in order to find another place to source more food. The lifestyle of a early farmer would have been different because you could be more grounded and live somewhere for a long time as a lot of your food would be from growing crops.

The cultural trends would of been by learning from

There is more space for your answer to this question on the following page.

→ wider y food source. variety

one another in order to expand your thinking of how to grow and produce food. This also would have meant speech would have been developed through sharing ideas. Trail and error through things not growing. knowledge being passed down through generation. to allow hominins not having to solely survive on hunting & gathering but transition into an agricultural lifestyle.

- A disadvantage of this transition from hunter gatherer to agriculture or farming would have been the number of trails it would of taken to know what to grow, how and when. This would of been time and energy consuming.
- An advantage of the transition was the communication development between hominins and also the variety of food available through growing crops.

Q4

Achievement exemplar for 91606 2015		Total score	10
Q	**Grade score**	**Annotation**	
1	A3	This question provides evidence towards A3 by describing the change in three skeletal features associated with bipedalism and the biological development of two of these changes.	
2	A3	The candidate identified the Oldowan tool culture and linked it to Homo habilis. Also described the effect of fire on cooking and softening meat for reduced chewing.	
3	A4	This candidate described the settled agricultural lifestyle of a farmer and implied the nomadic lifestyle of the hunter-gatherer. In addition the more reliable supply of food from crops was described.	