

Human Evolution

Bipedalism: *The ability to walk (upright) on TWO limbs*

Quadrupedalism: *A form of movement using FOUR limbs or legs*

1. Explain how each of the following skeletal structures have contributed to bipedalism in humans:

(a) Foramen magnum *The foramen magnum is located in a **more forward position**. Allows for the spine to extend vertically, balancing the body weight in upright movement*

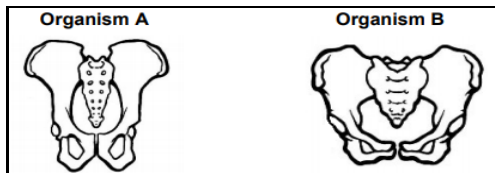
(b) Pelvic girdle
Shorter and wider pelvis
This allowed for better balance and stability / better support in up-right position

(c) Spine
s-shaped curved
This allowed for better balance / to support the increasing weight

Advantages of bipedalism

- Frees the arms so that they could carry 'things'
- Allows ability to see further to spot danger/food
- Reduces the surface area exposed to the sun
- Expose the genitals to attract opposite sex
- Efficient locomotion/allows to travel further

2. Diagrams showing pelvis of *Homo sapiens* and *Paranthropus troglodyte*/Chimpanzee

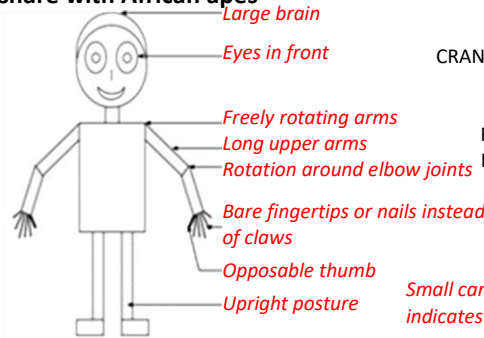


2.1. Which diagram, A or B, is bipedal?...**B**.....

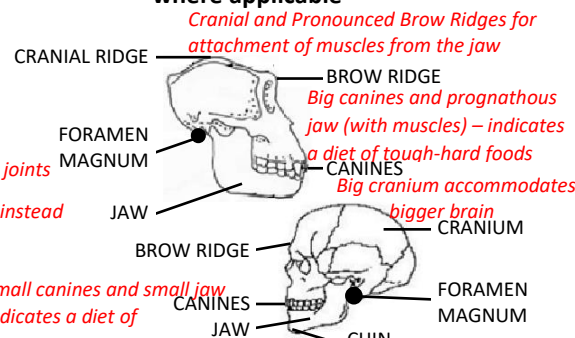
2.2. Explain your answer to question 1.
Pelvis B is shorter and wider.
This allowed for better balance and stability / better support in up-right position.

2.3. Explain the significance of the shape of the spine that is associated with pelvis B.
S-shaped curved spine, to balance the weight above the hips / support the weight of a bipedal organism. As with a short and wide pelvis, allows for walking on two limbs.

Structural similarities humans share with African apes



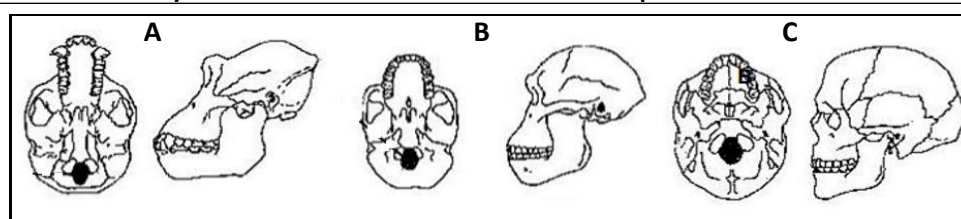
Give functions where applicable



Tabulate anatomical differences between humans and African apes

Feature	Humans	African apes
Cranium	<i>Large cranium/brain</i>	<i>Small cranium/brain</i>
Brow ridges	<i>Brow ridges not well developed</i>	<i>Brow ridges well developed</i>
Spine	<i>More curved (S-shaped spine)</i>	<i>Less curved (C-shaped spine)</i>
Pelvic girdle	<i>Short, wide pelvis</i>	<i>Long and narrow pelvis</i>
Canines	<i>Small canines</i>	<i>Large canines</i>
Jaws	<i>Less-prognathous / Small jaws</i>	<i>More prognathous / large jaws</i>
Cranial ridges	<i>No cranial ridge</i>	<i>Across the top of the cranium</i>
Foramen magnum	<i>In a forward position</i>	<i>In a backward position</i>

Study the skulls shown below and answer the questions that follow.



3.1 Give the letter of the diagram that represents:

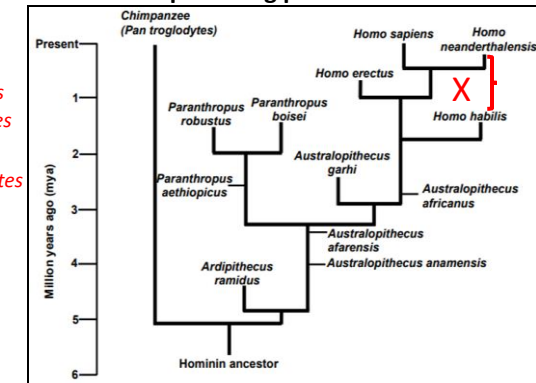
- (a) The skull with the largest brain capacity**C**.....
 (b) A more prognathous skull**A**.....
 (c) A skull attached to a c-shaped spine**A**.....

3.2 Explain how a change in the skull, from B to C, could indicate a change in intelligence.
There is an increase in the size of the cranium, from organism B to organism C
This will allow it to house/accommodate a bigger brain / cerebrum
A bigger brain / cerebrum suggests greater intelligence

3.3 Explain the significance of changes to the teeth of humans that shows progression in evolution.

***Bigger teeth/canines** in other primates (A and B)*
Indicates a diet of hard tough/uncooked foods – bigger teeth tear tough foods
***Smaller teeth/canines** in Homo species indicates a diet in softer cooked foods*
Because of cooking with fire

4. Phylogenetic tree showing evolutionary relationships among primates



4.1 What is this type of diagram called?
Phylogenetic tree

4.2 How many of EACH are present:

- (a) Genera**5**.....
 (b) Species**13**.....

4.3 When did:

(a) *Ardipithecus ramidus* become extinct.
4.3 / 4.4 / 4.5 mya (Any 1)

(b) *Homo erectus* first appear. *1 mya*.....

4.4 Name the:

- (a) *Hominid* species that existed at the same time as humans.
Homo neanderthalensis
 (b) First *homo* species to use tools.
(Homo) habilis

4.5 On the diagram, indicate with an "X" where *Homo naledi* would probably fit in. Also, explain why *Homo naledi* is regarded as an intermediate fossil

Homo naledi possesses a mixture of traits that are Australopithecus-like and Homo-like

4.6 Describe TWO lines of evidence that

suggest that humans originated in Africa

Fossil evidence: *Fossils of Ardipithecus and Australopithecus were found in Africa ONLY.*

Oldest Homo fossils discovered in Africa and younger Homo fossils in other continents.

Genetic Evidence: *Analysis of mutations on the mitochondrial DNA / mtDNA shows that the oldest female ancestor were located in Africa.*

4.7 Name a fossil/s discovered in:

- (a) South Africa *Mrs Ples; Taung child; H. naledi*
 (b) East Africa *Lucy*