



Gibbon

Orangutan

Chimpanzee

Gorilla

Man

# HUMAN EVOLUTION

A FOCUS on the MOST ADVANCED PRODUCT of  
EVOLUTION:

*HUMANKIND*

# BACKGROUND INFORMATION



- The Evolutionary (Phylo-Genetic) Tree on page 91 shows how **Animals** appear to have developed differently from **Plants**, how **Vertebrates** evolved, how **Mammals** developed, how ***Primates*** resulted.
- ***Primates*** are the ancestors of all two-legged creatures, including humans and all forms of monkeys.
- Orangutans, Gorillas, Chimpanzees, and our Human ancestors were all ***Hominids***. Then all of these evolved and changed in their own different ways.
- The first identifiable human from here was ***Ardipithecus***, which evolved into ***Australopithecus***, and then into ***Homo***. Humans are now ***Homo Sapiens***.



# HUMANS and AFRICAN APES



## SIMILARITIES



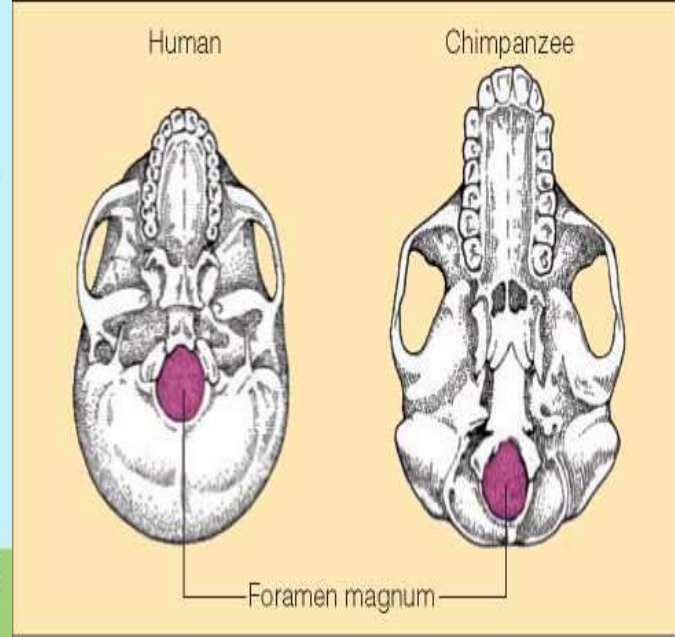
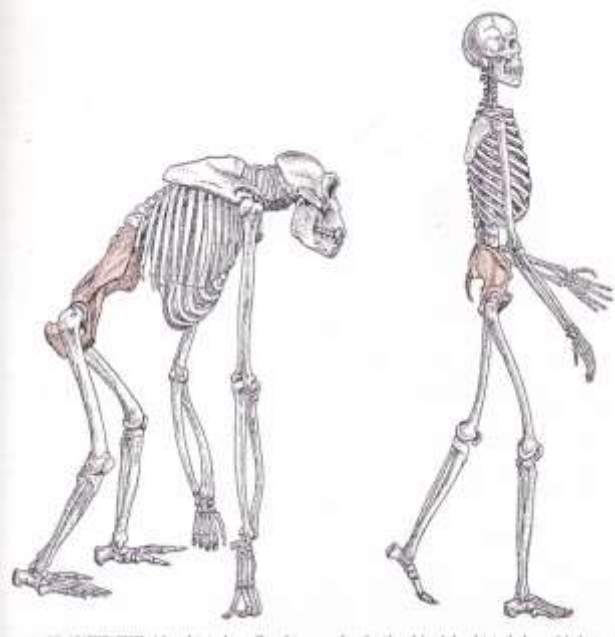
## DIFFERENCES

- Large brains.
- Protected binocular eyes in the front.
- Small nose.
- Omnivorous teeth.
- Freely rotating arm joints.
- Fingers with gripping prints.
- Nails (not claws).
- Opposable thumbs.
- No tail.



- Better organised brain.
- Fully biPedal – no trees.
- Central *foramen magnum*.
- Wider pelvis for upper body.
- More precise grip.
- Less face muscles: small jaw, flat face, no brow ridges.
- Smaller canines – jaw less square.
- No opposable toes.

# ADVANTAGES of BI-PEDALISM

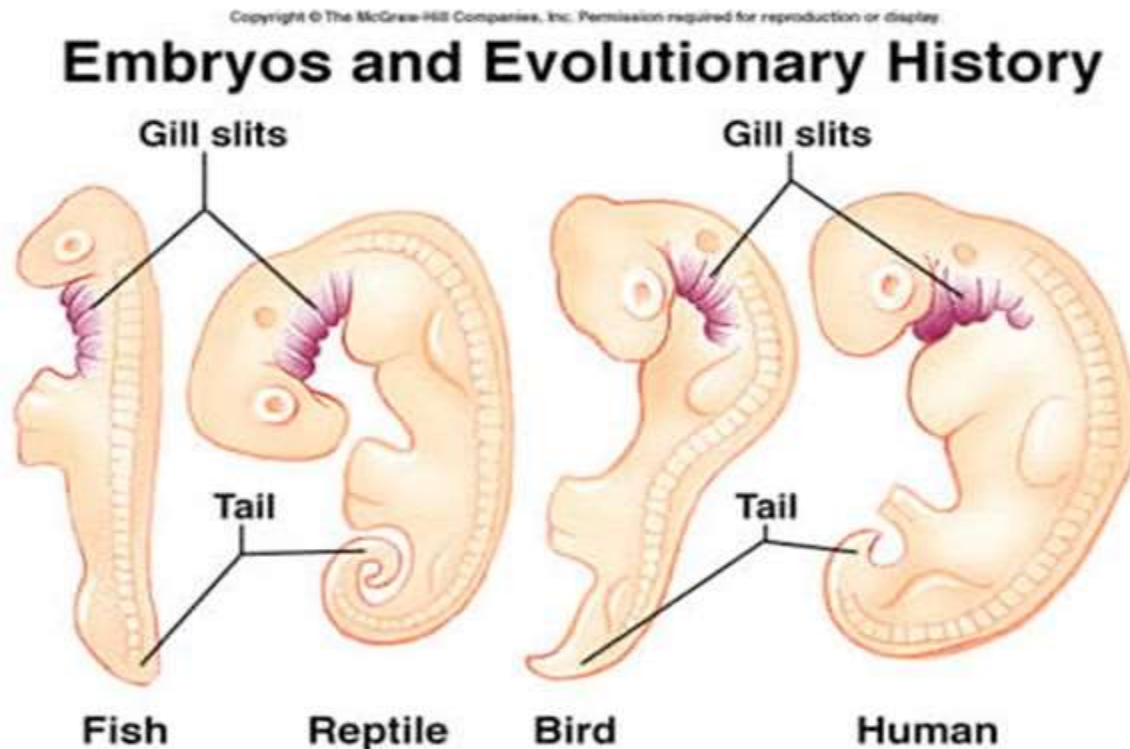


- Your head is higher – you can see the things around you.
- Movement is less clumsy on two feet.
- Your body is more exposed, and cools quicker.
- When it still mattered, males were able to show off their sex-organs to females that they were trying to attract.

# GENETIC “SUPPORT” for EVOLUTION

## Support for Evolution 4: Embryology

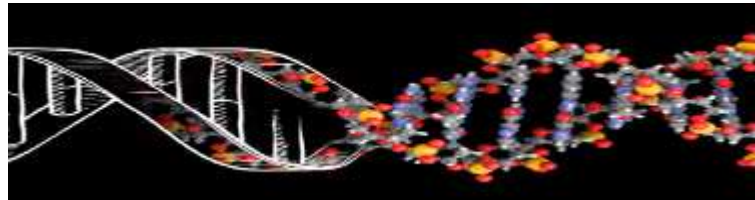
- Similar patterns of embryological development.





# MORE GENETIC “SUPPORT”

- Every human female has **exactly** the same DNA in a specific mitochondrion, that proves they are **all** descended from **one** woman, who lived 150 000 years ago. Scientists call her *African Eve*.



- Every human male has **exactly** the same definite marker on their Y-chromosome, that proves they are **all** descended from **one** man, who lived 60 000 years ago.

# CULTURAL “SUPPORT” for EVOLUTION



- Other Primates, like Chimpanzees, use twigs as tools for collecting termites – that is as sophisticated as they have become.
- Humans developed stone tool technology two million years ago.
- We can trace our further sophistication: using wood, then plant fibres, then metals, and now artificial materials.

# **FOSSIL “SUPPORT” for EVOLUTION**

Looking at fossils to trace humans of today with our ancestors, scientists have looked at:

- Spine and pelvis – to trace our biPedalism.
- Brain size – to see how it increased.
- The teeth – to see how they became more evenly shaped.
- Size of jaw – to see how it was getting smaller.
- Ridges on skull’s brow – less need for muscles.

**THEIR CONCLUSIONS ARE AS FOLLOWS:**



## AUSTRALOPITHECUS

Height: 1.10m  
Weight: 40kg  
Walked up right

## HOMO HABILIS

Height: 1.59m  
Weight: 50kg  
First tools  
Could speak

## HOMO ERECTUS

Height: 1.6m  
Weight: 60kg  
Discovery of fire  
Hunted in groups

## HOMO NEANDERTHALENSIS

Height: 1.65m  
Weight: 80kg  
First burials  
Specialized tools

## HOMO SAPIENS SAPIENS

Height: 1.7m  
Weight: 70kg  
Examples of art  
Tools made of bone and horn



3500000/2500000 years ago



2300000/1800000 years ago



1800000/400000 years ago



150000/35000 years ago



40000 years ago in Europe

<u>Characteristic</u>	<u>Ardipithecus</u>	<u>Australopithecus</u>	<u>Homo</u>
<u>Time</u>	4½ million years ago, and earlier.	4 million to 2 million years ago.	From 2 million years ago till now.
<u>Brain Size</u>	325 ml.	500 ml.	Grew from 600 ml to 1½ litres now.
<u>Brow Ridges</u>	Smaller than apes.	Still prominent.	Now absent.
<u>Foramen Magnum</u>	Further forward than apes.	Even more forward.	Now central.
<u>Teeth</u>	Canines slightly smaller than apes.	Canines & Incisors smaller, molars big.	More regular, rounder palate.
<u>Jaws</u>	Smaller than	Still large.	Not jutting out.