

Things to remember in the last hour before the exam – Level 3 Human Evolution

(This is not a revision sheet- you've done that by now, it is a list of things you might want to remind yourself about...)

- The term **hominins** refers to living and fossil species belonging to the **human lineage**. This is a subgroup of **hominids** which includes both **humans and the great apes**

Trends in Biological Evolution

Skeletal differences between apes and bipedal

This change to bipedalism was probably the most important step in our evolution because it freed the hands, allowing us to take advantage of our larger brain and is **Biological evolution**; only passed on genetically and occurs at a slow rate.

Apes (quadrupedal)	H. sapiens (bipedal)	Reason for change
Opposable big toe	Big toe in line	Linear motion (not side to side "waddle") Absorbs shock of bipedal motion – more efficient
Flat foot	Arched foot	
Curved spine	S- shaped spine	
Large sagittal crest	No/ reduced sagittal crest	More refined diet , no need for really strong chewing muscles, muscle attachment points, or teeth
Large zygomatic arch	Small zygomatic arch	
Large jaw, bigger teeth	Small jaw, smaller teeth	
Brow ridge	No brow ridge	
Foramen magnum back of the lower side of the skull	Foramen magnum central/bottom of skull	Head vertical on spine – less muscle attachment needed, centre of gravity more central
Pelvis is long and narrow	Pelvis short and wide	Supports organs above, provides better muscle attachment and balance
Bottom of femur smaller	Bottom of femur buttressed	Increased support of vertical mass
Femur attaches to knee vertically	Femur angled to lower leg (valgus angle)	Allows better weight distribution; balance Feet under COG , more efficient motion
Long arm: leg ratio	Shorter arms	Not needed for brachiating
Very strong neck muscles which attach to the nuchal crest	Nuchal crest absent	Humans skulls are balanced above the first vertebrae

More curved with less mobile fingers- power grip	Shorter, straighter fingers - precision grip	No longer need to grip branches (brachiate). Precision grip important for tool making and use.
Hairs are longer and coarser with few sweat glands	Same numbers of hair but it is much finer, more sweat glands	Change in climate – helped keep cool
Cranial capacity ~450cc	Bigger cranium (~1450cc)	Increased brain development- higher level of thinking, speech, memory etc.

Advantage of bipedalism

- Free hands, carrying things (food, tools baby etc.)
- Heat regulation
- Less energy needed to move long distances
- See further

Disadvantages of being bipedal

- Giving birth to a larger headed younger baby
- Back ache

Cultural evolution this is the non-genetic passing on of information through teaching of ideas, beliefs and knowledge by learning from other members of the group, occurs through learning and more than one person can taught at a time, cultural evolution occurs at a faster rate.

Tools

Oldowan <i>H. habilis</i>	Simple multi-purpose shaped rock with sharp end and sharp flakes
Acheulean <i>H. erectus</i>	More diverse; with hand axes , choppers, and hammer stones
Mousterian <i>H. neanderthalensis</i>	Wide range of finely worked tools, including awls for punching holes in clothing, and blades made from prepared cores
Upper Palaeolithic <i>H. sapiens</i>	Includes tools made from bone and ivory , including needles and fish hooks
Neolithic <i>H. sapiens</i>	Includes pottery etc.

Farming and domestication of animals

- *H. neanderthalensis* had **clothing**.
- *H. sapiens* began **agriculture**.
- First animals to be domesticated were dogs then goats, sheep and pigs
- First plants were wild wheat about 18,000 years ago.

Positives of agriculture	Negatives of agriculture
<p>Better housing and clothing</p> <p>Division of labour</p> <p>Improved health/nutrition, fewer people died of starvation</p> <p>Development of new technologies; tools, pottery, commerce, politics, transport. Therefore, more food grown by fewer people</p> <p>New ideas such as written language, education, religion</p> <p>More time to develop other skills such as art etc.</p>	<p>Vulnerability to crop failure</p> <p>Many crops come due at the same time therefore had to be stored</p> <p>Their diet was restricted to what they could grow</p> <p>Fighting over resources</p> <p>Increased disease risk</p> <p>Waste disposal problems</p> <p>Using up resources in area</p> <p>Reduction of individual survival ability</p>

Fire:

First used by *H. erectus*. Used extensively and controlled by *H. sapiens*.

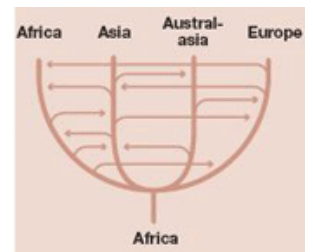
Was important for a number of reasons: **protection**, a **home base**, **light**, **warmth**, **health**, herding animals, making **tools**

Dispersal:

“Multiregional”

H. sapiens **evolved independently** in many places from *H. ergaster*/*H. erectus* over 1-2 mya (million year ago).

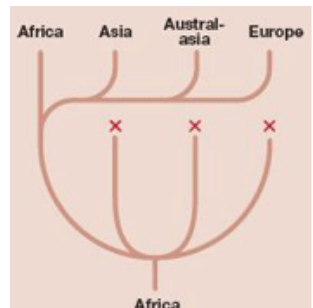
- This is supported, but much less well, by some fossil evidence that *H. ergaster* was in Europe, the belief that 170,000 years is too short to develop the racial differences present today, and a mistrust of mtDNA evidence.



“Out of Africa” (replacement)

H. sapiens **evolved in Africa** up until **170,000** years ago, and then colonised the world, **replacing other hominin** species as he went.

- This is supported by fossil evidence, mtDNA, and genetics similarities across races. Also that Multiregional would require gene flow across continents during last million years (unlikely due to vast distances).



“Assimilation” (partial replacement, new theory)

- Modern humans evolved in Africa and spread across the world, **interbreeding** at times with other hominins that had left Africa earlier, such as Denisovians and Neanderthals.

