

**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.

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

More curved with less mobile fingers- <b>power grip</b>	<b>Shorter, straighter fingers - precision grip</b>	No longer need to grip branches (brachiate). <b>Precision grip</b> 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 <b>cranium</b> (~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

<u>Oldowan</u> <i>H. habilis</i>	Simple <b>multi-purpose shaped rock</b> with sharp end and sharp flakes
<u>Acheulean</u> <i>H. erectus</i>	More diverse; with <b>hand axes</b> , choppers, and hammer stones
<u>Mousterian</u> <i>H. neanderthalensis</i>	Wide range of finely worked tools, including <b>awls</b> for punching holes in clothing, and <b>blades</b> made from prepared cores
<u>Upper Palaeolithic</u> <i>H. sapiens</i>	Includes tools made from <b>bone and ivory</b> , including <b>needles</b> and <b>fish hooks</b>
<u>Neolithic</u> <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
Better housing and clothing	Vulnerability to crop failure
Division of labour	Many crops come due at the same time therefore had to be stored
Improved health/nutrition, fewer people died of starvation	Their diet was restricted to what they could grow
Development of new technologies; tools, pottery, commerce, politics, transport. Therefore, more food grown by fewer people	Fighting over resources
New ideas such as written language, education, religion	Increased disease risk
More time to develop other skills such as art etc.	Waste disposal problems
	Using up resources in area
	Reduction of individual survival ability

**Fire:**

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

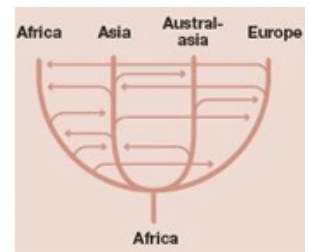
Was important for a number of reasons: **protection**, a **home base**, **light**, **warmth**, **health**, herding animals, making **tools**

**Dispersal:**

**“Multiregional”**

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

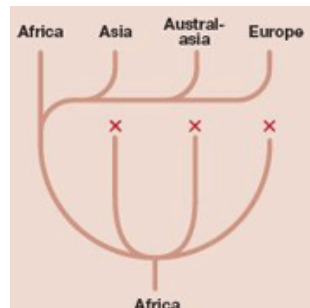
- This is supported, but much less well, by some fossil evidence that *H. ergaster* was in Europe, the belief that 170,000 years is too short to develop the racial differences present today, and a mistrust of mtDNA evidence.



**“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.

