**THINGS THAT HAVE CHANGED OVER TIME**

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| **Structure** | **Adaption** |
| Foramen magnum | located centrally in the base of the cranium |
| Jaw bone | Small and non-protruding, enabling the skull to balance on the vertebral column |
| Vertebral column | Lumbar vertebrae wedge-shaped, producing an s-shape curve that brings the vertebral column directly under the centre of the skull |
| Pelvis | Broad; shallow from top to bottom. Provides support for the abdominal organs. Attachment of femurs is wide apart, contributing to the carrying angle |
| Femurs | Large head of the femur contributes to carrying angle |
| Knee joint | Outer ‘hinge’ larger and stronger, to take weight of body. Knee is able to be straightened |
| Legs | Longer than arms, contributing to a low centre of gravity. Carrying angle allows the weight of the body to be kept close to the central axis |
| Foot | Large heel bone and aligned big toe form a pedestal on which the body is supported. Foot has both longitudinal and transverse arches |

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|  | **Australopithecines**  **2.5 mil years ago** | **Homo Habilis**  **1.9 mil years ago** | **Homo Erectus**  **1.5 mil years ago** | **Homo Sapians**  **250,000-350,000 yrs** |
| **Physical features** | * Face not as protruding as an ape * Skull more round * Teeth; canines are short/non-projecting * Low forehead * More protruding upper/lower jaw * Body weight 1/3 of gorilla * Foramen more forward * Brain size is somewhere between the size of humans and chimpanzees | * More advanced than Australopithecus * Larger brain * Smaller teeth * Stood more erect * More powerful grasp than us * Bulge in speech-producing area of brain though larynx not capable of making complex sounds * Brain size = 775cm3 * Walked upright * Hands more robust that humans – for climbing | * jaw shorter and more compact * chin beginning to form * more modern teeth/smaller * footprints discovered in sedimentary rock – big toe parallel to other toes * brain size= 1075cm3 | * larger brain capacity * forehead more prominent than homo erectus * brain size = 1150cm3 * back of skull more rounded * thinner bone in cranium * foramen magnum under centre of skull * development of chin |
| **Tools** | * pebble tools * e.g. choppers, scrapers, flakes and chisels * done by removing several flakes from a stone | * Rocks were crudeley fashioned and sharpened and used to butcher the carcass of animals for food | * used fire – kept away predators, warmth, light, cooking – increased range of food to eat * built shelters * had a range of tools * flaked around edges * teardrop shape * used as hand axes | * finer blades * projectile weapons * began to make clothing and better shelters – thrive in cold |
| **Living together** | * prehistoric hunters * brought back food for sharing * hunters/foragers went out to search, using their home base as somewhere to come back to | * food sharing essential * begun eating meat, but often returned empty handed * relied on plants because of this * could communicate with simple sounds and gestures | * skilful hunters * able to modify environment to suit their own purpose * hence became more independent form environment * capable of logical thought/ability to communicate in a organized/efficient manner | * fully articulate speech * hunted herd animals that occupied open plains |

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| **Anatomical Feature** | **Considered to be More Primitive** | **Considered to be More Modern** |
|  | Characteristics more ape-like Characteristics more human-like | |
| Skull | Thicker bones forming craniumSmaller cranial cappacity  Heavier brow ridges  No forehead or sloping forehead  Lower cranium  Less prominent cheek bones  Possible crest on top of the skull  Formen magnum towards back of skulls | Thinner bones forming cranium  Larger cranial capacity  Brow ridge reduced or absent  Increasinly larger and more vertical forehead  More dome-shaped cranimum  More prodominant cheek bones  No crest on top of skull  Foraman magnum under centre of skull |
| Mandible and teeth | More prognathic jaw  Heavier, thicker mandible  No chin  Larger teeth, especially molars  Diastema present  Canine teeth more prominent | Flatter face  More slender, thinner mandible  Increasingly define chin  Smaller teeth  No diastema  Canine teeth less prominent |
| Torso | Narrower hips (pelvis)  Back (lumber) vertebrae less wedged-shape | Broader hips  Lumbar vertebrae more wedged-shape |
| Upper limb | Shorter thumb  Fingers more curved | Longer thumbs  Finger straighter |
| Lower limb | Femur more parallel  Arms longer then legs | Femur sloping inwards towards knee  Arms shorter then legs |

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| **ABSOLUTE DATING** | |
| **Type** | **Explanation** |
| Potassium dating | * a method of calculating the age of a fossil or artefact using the known rate of decay of radioactive K, forming argon * Limited use fullness – not all rock types suitable and it can only date rocks older than **100,000 to 200,000 years** |
| Carbon dating | * the calculation of the age of a fossil or artefact using the known rate of decay of radioactive carbon, forming nitrogen * measuring the amount of radiation liberated by a sample, the ratio of carbon-14 to carbon-12 can be estimated, and from this the age of the sample can be calculated * Normal method of radiocarbon dating requires at least 3g of organic material * Accelerator mass spectrometry (AMS) radioactive dating; a technique used to give radiocarbon dates for very small samples of material, as small as 100 micrograms * Involves breaking sample up into its constituent atoms * Cannot be used to date back more than about **60,000 years** * Material to be dated must contain organic compounds – must contain carbon * Corrections for the fluctuations in the carbon-14 content of the atmosphere |
| Dendrochronology | * a method of determining the age of wood by counting the annual growth rings in the timber * Each ring represents a year’s growth and rings differ in width according to how favourable the growing season was * Conditions necessary for the use of the method do not occur often and timber is rarely preserve for more than a few thousand years |
| **RELATIVE DATING** | |
| **Type** | **Explanation** |
| Stratigraphy | * The study of the sequence of rock layers as a means of relative dating. * Superposition; which assumes that in layers of sedimentary rock the layers at the top are younger than those beneath them * Distortions of Earth’s crust occur and a sequence of rock layers may be turned upside down * Fossils or artefacts may be buried by animals or humans, in this case specimen may be younger than some of the layers above it |
| Correlation or rock strata | * which involves matching layers of rock from different areas * Matching of strata can be done by examining the rock itself and also by studying the fossil it contains |
| Fluorine dating | * A method of determining the relative age of a fossil or artefact by measuring the amount of fluoride absorbed from the soil. * Based on the fact that when a bone is left in soil, fluoride ions, which are present in the water in the soil, replace some of the ions in the bone itself * The older the fossil the more fluoride it contains * Absolute ages not possible, concentration of fluoride in ground water varies from place to place |