**Getting from Achieved to Merit**

The intent of this standard is to test your knowledge of CHANGE over time in human evolution.

In this table, describe the **change** that occurred in each body part and then elaborate as to **why** this was an adaptive advantage.

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| **Body Part** | **Change over time** | **Why was this helpful?** |
| Sagittal Crest | Reduced and disappeared | No longer needed for large chewing muscles and jaw = energy saved, allowed cranial cavity to expand |
| Nuchal Crest | Reduced | No longer needed for huge neck muscles = energy saved |
| Zygomatic Arch | Reduced | Smaller jaw muscles to pass through so could reduce = energy saved |
| Jaw | Smaller, U-shaped to parabolic (bow-like) | Less tough food to chew thanks to cooking and meat-eating = energy saved, fits more teeth into smaller jaw (maybe??) |
| Teeth | Smaller, loss of diastema | No longer needed large grinding surface and loss of huge lower canines and sexual dimorphism = energy saved and change in mate selection/group? |
| Hand | Straightened bones, elongated thumb, precision grip | Better manipulation of tools and objects, not branch grasping |
| Chest | Barrel shape flattened | Brings COG closer to spine |
| Foramen Magnum | Moved from the rear to underneath the skull | Balances heavy head over COG instead of hanging forward from quadrupedal position, passive support |
| Brow Ridge | Reduced | Not needed for countering stress from chewing = energy saved, allows better vision |
| Feet | Forward facing big toe, arched, straightened toe bones | Toe acts as lever and arched tendons act as spring for walking/running, can stand comfortable on flat surface not curved branch |
| Shoulder | Clavicle shorter and horizontal, scapula has moved forward then back | Less for structural support while walking, more for mobility (H. erectus probably couldn’t throw or run well) |
| Pelvis | More bowl-shaped, shorter and flared | Supports abdominal organs = less energy spent by abdominal wall muscle, reduced distance from sacro-iliac and hip joint = less stress |
| Skin | More sweat glands, finer hair | Better thermoregulation for endurance activities |
| Brain | Huge growth in cerebrum, some growth in cerebellum, Broca’s and Wernicke’s areas develop | Better problem solving, planning,abstract thought, fine motor control and speech and language = all help survival |
| Pharynx | Longer | Allows full range of vowel sounds, better communication |
| Newborn dependence | Increased | Bigger brain can’t get through pelvis girdle = earlier births and more helpless newborns (alternative is death for both) |
| Spine | C to S | Brings COG central, acts as shock absorber (but causes pain) |

To get to Excellence: selection pressures, adaptive advantage - more likely to survive and reproduce, heritable, increase in gene pool