Word Count: 699 **Tiya Chokhani**

Tool usage as an adaptive strategy in human development dates back 3.3 million years when stone tools were discovered at prehistoric sites(Toth and Schick, 2015). The archaeological record reveals a significant period of reliance on stone tools, documented by a steadily rising rate of technical development.

The earliest stone tools are called “Oldowan” and have been dated back to 2.3mya. Experiments have shown that these tools were made by removing flakes from stone cores and that they could have been used as ‘cutting tools’(Toth, 1985). Early hominins could have used these flakes as knives to hunt small animals, scavenge carcasses, or make spears from branches. According to the "expensive tissue theory," being able to acquire and add meat to their diets could have played a critical role in enabling the evolution and development of the human brain, thus changing their biology(Aiello and Wheeler, 1995). It can be seen that hominins started transporting stones across the terrain by comparing the geological source of the rock against the sites where they were found. There’s evidence of selectivity and choice in the selection of stones used. Hence, it’s clear that hominins did not use a random selection of locally available stones. This shows a significant change and growth in cognition as they weren't just using the tools by accident but were planning and actively thinking about their use (Toth and Schick, 2015).

Beginning at 1.8mya, hominins created more advanced stone tools known as Acheulean technology, which marked a substantial change from Oldowan toolmaking. The large cores needed to make Acheulean tools fanned larger distances than those needed for Oldowan tools. Since these cores were more likely to be found in more upstream areas, the emergence of this technology can act as proof that hominins were utilizing more upstream regions of the environment (Toth and Schick, 2015). The process of making these tools was more elaborate and time-consuming. Moreover, Acheulean tools production required more than 4 times the cognitive effort needed to make Oldowan tools (Toth and Schick, 2015). Therefore, it can be seen how the level of cognition is increasing alongside the amount of cognitive effort being applied. These tools are extremely useful in hunting large animals which could point towards a shift to meat in hominin's diet and as mentioned earlier, this could have helped expand their brain tissue allowing for more enhanced tool-related behavior and cognitive processes.

The Middle Palaeolithic stage started about 300kya. The main technology used in this era was flake tools that were built using specific types of cores. These tools usually had some sort of *standardization* and their production followed a set process. Compared to prior technologies, these "prepared core" technologies imply stronger cognitive abilities and predetermination (Toth and Schick, 2015). Microscopic use-wear analysis suggested that these tools could have been used in “composite tools” like a shaft in a throwing spear. This shows how hominins are not only using tools for multiple things but are now putting them together to try and create more complex technologies which help improve their standard of living. During this time, evidence of fire at habitation sites also becomes considerably more frequent(Toth and Schick, 2015). The use of fire in everyday life necessitates a detailed understanding of the mechanical processes of production as well as the other materials needed. Controlling fire creation and utilization would increase their capacity to compete against predators on the terrain, as well as broaden their access to food supplies and nutritional value allowing for better biological brain and body development.

While human fossils can tell us a lot about previous hominin species they can tell us, even more, when studied alongside archaeological evidence. Finding fossils can be extremely difficult as we have to locate the geological surfaces of interest and the locations of ecological zones that are suitable. Even when fossils are found they still can't tell us about the activities and behaviors of the species, so we need archeological evidence to provide context for the behavior surrounding the fossils. For example, when fossils are found in pits with animal carcasses and tools that can tell us that these species were either hunting animals or scavaging for their meat, but if only the fossils were found then we would just be able to tell the species resided here at one point.