ANTHR 1L: Biological Anthro Lab **Name**_____
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Bones of Contention: Archaic and Modern Homo Sapiens

INTRODUCTION

By about 400,000 years ago, hominids with a mix of *Homo erectus* and *Homo sapiens* features appeared. These hominids have been found in the same places *Homo erectus* has been found---Africa, Asia, and Europe----and are clearly descended from these *H. erectus* populations. These hominids have been grouped together as "***Archaic Homo sapiens"*** based on their possession of a suite of transitional characteristics. Given their wide geographical range, however, they probably represent more than one species. Some of the European fossils, for example, have been assigned to *Homo heidelbergensis* (a reference to the German city near the site the fossils were first discovered). There is still no consensus on classifications at this point, so, we will continue to refer to these hominids as ***"Archaics."***

The ***"Archaic" Homo sapiens*** group is frequently divided into two subgroups, based on time of occurrence. The first consists of fossils referred to as **early "archaics,"** which lived between 400,000 to roughly 200,000 years ago. Around the time of their disappearance, two groups of people appeared. One was the **late "archaics,"** which include the intriguing **Neanderthals**, and the other was **anatomically modern humans**.

	Early "Archaics"	Neanderthals	Homo sapiens
Time range	400,000 – 200,000 ya	130,000 – 30,000 ya	150,000 ya (1st appearance)
Geographic distribution	Africa, Asia, Europe	Europe & Middle East	Throughout Africa, Middle East, Asia, S.E. Asia, Europe, Australia, N. & S. America
Cranial capacity	1125 – 1390 cc	1520 cc (Average)	1400 cc (Average)

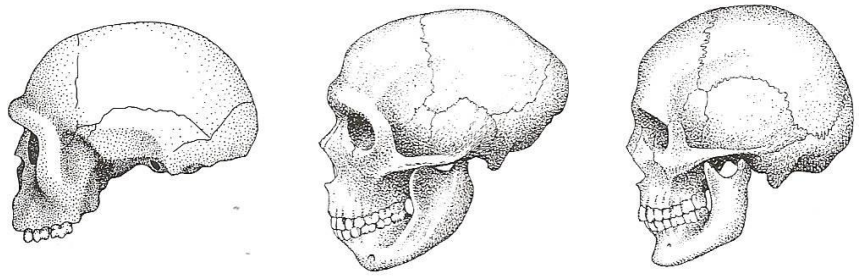

FIGURE 13.1 Variations on a theme: archaic *Homo sapiens*, Neandertal, and anatomically modern *Homo sapiens* skulls.

Cultural innovations – Early Archaics, Neanderthals, and anatomically modern humans

The "Archaics" were culturally more diverse than *Homo erectus*, with advances including **new and more varied tools, some primitive shelters, and more efficient hunting techniques.** While use of the Acheulean tools continued for a time, they began to be interspersed with new tool-making techniques, particularly one undertaken to create **Levallois** style flake tools. In this technique, the core was modified to produce more predictable sizes and shapes of flakes. The hafting of points onto shafts for spears was another innovation of this time.

The period of cultural history associated with the **Neanderthals** is traditionally called the *Middle Paleolithic*, and represents another phase of evolutionary advancement. For example, the stone tools made by Neanderthals were more complex and varied than those manufactured by the early archaics. Their tool tradition, known as the **Mousterian** industry, included close to 60 different types of tools such as scrapers and points that were attached

to a shaft or handle. These tools helped the Neanderthals to procure food more effectively and enhanced their ability to make animal skin clothing/covering (no evidence of sewing yet) and construct shelters. These were important developments in the context of the increasingly harsh Ice Age conditions that prevailed in Eurasia.

These conditions also had implications for diet and social organization among the Neanderthals. The possession of more and varied tools probably limited the mobility of the Neanderthals. Evidence of this comes from the depth of deposits at Neanderthal sites indicating long habitation periods and the preservation of long production sequences, resharpening and discarding of tools, large-scale butchering and cooking of game. Meat and animal fats were not only the main dietary staple it was essential for cold weather survival as a source of energy, needed for hunting and keeping the body warm. Hunting of large game and evidence of mass hunting such as driving herds over cliffs suggests that Neanderthals had a fairly sophisticated hunting culture. Close range hunting of massive animals such as woolly mammoths and rhinos required not only extreme bravery and courage, but foresight, strategizing, organization and skill. Some advanced form of communication was probably also present, and certainly the ability to speak was present in Neanderthals. Whether or not they actually used a verbal language as we know it remains unknown.

Another cultural innovation that gives us a glimpse of the increasingly complex social lives of the Neanderthals come from cave sites in Israel and Europe that have yielded tantalizing evidence that the Neanderthals practiced intentional burial of their dead. The socio-cultural significance of this is that one, Neanderthals were probably deeply connected to individuals in their social groups and two, perhaps had some belief in an afterlife, thus, the beginnings of religion. Pollen remains and precise placement of stone tools around the skeletons in the burials lend further evidence of the deliberate nature of these internments.

Much debate surrounds the fate of the Neanderthals. Some paleoanthropologists state that Neanderthals, like other archaic forms, evolved into anatomically modern versions of *Homo sapiens* as different features of "modern" anatomy arising in other regional populations were carried to them through gene flow. This model is known as **Multi-Regional Evolution**. In this view, archaic populations throughout Africa, Europe, and Asia contributed to the making of modern humans via local population continuity. Multi-regional evolution relies heavily on the processes of gene flow and genetic drift and there is very strong fossil evidence to support this model. However, there is equally strong genetic evidence to support a different interpretation.

Other paleoanthropologists, therefore, argue that anatomically modern humans, with superior cultural capabilities, appeared first in Africa around 200,000 years ago and replaced existing archaic forms, including the Neanderthals, as they spread from Africa to the rest of the world. Relying heavily on analysis of mitochondrial DNA (which is inherited only from one's mother and does not undergo any recombination during meiosis) to reconstruct family trees, the **Recent African Origin** or **Replacement** model, appears to trace the ancestry of all living humans back to a single female or group of females (Mitochondrial Eve) who lived in Africa some 200,000 years ago. In other words, we are all Africans. (Note: Recent analysis of the male Y chromosome has suggested a similar pattern for a Y chromosome Adam, lending further genetic support to the RAO model).

How do we reconcile the genetic and fossil evidence that seems to suggest two entirely different evolutionary trajectories? And how do we make sense of strong and clear evidence of thousands of years of coexistence for Neanderthals and anatomically modern human populations? Were these two types of humans really that different from each other? Could they have interbred at some point? And wouldn't the Neanderthal traits that had been advantageous for survival in a harsh, cold climate been of little advantage at the end of the Ice Age, and thus, "swamped" out through interbreeding with anatomically moderns and the process of natural selection? Clearly, there are more questions than answers. Only more fossil discoveries and the development of more precise, advanced techniques and methods of genetic analysis will assist in answering them.

The appearance of anatomically modern humans in Africa marks a new cultural period known as the Upper Paleolithic. During this time, intelligence becomes the main survival strategy as well as the reliance on cultural rather than biological adaptations. Upper Paleolithic cultures generally include a greater diversity of tools than before and a predominance of blade tools such as knives. Pressure flaking techniques and the use of burins to fashion implements of bone, antler and ivory became widespread. An explosion of creativity also occurred and is

represented by impressive works of art such as cave paintings, figurines carved of stone and ivory, and jewelry made of beans, bone, and shells. Anatomically modern humans lived in caves and rock shelters, but also constructed structures out in the open. With more sophisticated tools and intelligence, they did not have to fear predators in the same way that their predecessors did. Indeed, with their advanced hunting skills and hunting implements (spears, spear throwers, etc.), these hominids were a formidable predator themselves. Eventually, Upper Paleolithic peoples expanded into regions previously uninhabited by their archaic forebears. Anthropologists have used archaeological, linguistic, and biological evidence to reconstruct the spread of humans into Australia, New Guinea and the Americas. As human populations grew and spread, cultural differences between regions also became more marked.

PART ONE

Go to the lab table where the hominid skulls have been placed and complete the following table. Be descriptive, and use illustrations if needed.

	Archaic **Homo sapiens** **(***H. heidelbergensis)*	**Neanderthal** *(Homo neanderthalensis)*	**Modern Human** *(Homo sapiens)*
Cranium shape (height vs.length)			
Cranium size relative to facial skull			
Forehead appearance			
Supraorbital ridge size/appearance			
Size/appearance of eye sockets			
Degree of midfacial prognathism			
Size/appearance of nasal opening (aperture)			
Shape of occipital & nuchal region (bun? torus?)			
Shape of dental arcade (narrow, wide, u-shaped)			
Size of front teeth relative to back			

What are the main differences between the archaic (*H.* heidelbergensis and *H.* neanderthalensis) and modern human skulls? List them below and BE SPECIFIC.

PART TWO – Post cranial comparisons

For this part of the lab exercise refer to the illustration handout provided. Describe the major differences between the Neanderthal and modern human skeletal features listed below:

a) Limb proportions

b) Rib cage

c) Stature

ANALYSIS & REVIEW

1. Based on your observations, what can you say about the differences between Neanderthals and modern humans in terms of:

a) cranial/skull features:

b) front versus back teeth:

c) body size:

2. Describe the cultural advances made by the Neanderthals that distinguish them from their *Homo erectus* ancestors.

3. Based on the lab reading what were some of the limitations or challenges the Neanderthals faced in surviving as anatomically modern humans began moving into their territory & the climate gradually began to change?