

**Unit 4: Paleoanthropological Methods, Primate Evolution, and Early Hominids****Reading:**

Larsen, Chapters 8, 9 and 10, Chapter 11 (pp. 263-268)

Handout of the bones of the skeleton

**\*\*HIGHLIGHTED PORTIONS FOR EXAM 2\*\***

Review Chapter 4 in Shubin

**Learning Objectives:**

Before we get too far into the fossil record, we first have to learn more about how this kind of research is done. First, we will delve into the sometimes dry topic of dating techniques and taphonomy. To begin our practice of fossil analysis, we will learn first about the earliest primate fossils. Then we will jump into the human fossil record (at least the first few million years). For Chapter 9, we will focus on the broad patterns of change and hit some highlights of fossils that are most important rather than the details of every species presented in your text. However, those you should definitely know (names, location, place in family tree) of those species that are listed below.

**Terminology:**

<b><u>Paleoanthropological Techniques:</u></b>		
paleoanthropology	fossil	phylogeny
relative dating	absolute dating	strata/stratum
stratigraphy	biostratigraphy	paleomagnetism
fluorine analysis	Potassium-argon (K-Ar)	Carbon-14 ( <sup>14</sup> C)
half-life	isotope	
genetic dating	molecular clock	paleoecology
pollen analysis (palynology)	faunal analysis	chemical analysis of bones
C <sub>3</sub> vs. C <sub>4</sub> plants	taphonomy	cultural dating (for recent fossils)
<b><u>Fossil Primates:</u></b>		
visual predation hypothesis	preadaptation	arboreal hypothesis
<u>Eosimias</u>	Fayum	<u>Aegyptopithecus</u>
<u>Apidium</u>	<u>Branisella</u>	
New World primate hypotheses	dental apes	<u>Proconsul</u>
<u>Sivapithecus</u>	<u>Gigantopithecus</u>	<u>Oreopithecus</u>

<b>Early Hominids</b> —know the key traits of each species, where they lived, and when		
hominid	Hominidae	hominid traits (p. 235)
Pitldown	bipedalism	nonhoning canine
bipedalism hypotheses	mosaic evolution	East vs. South African sites
<u>Sahelanthropus tchadensis</u> (7-6 mya)	<u>Orrorin tugenensis</u> (6 mya)	<u>Ardipithecus ramidus</u> (4.4 mya)
<u>Australopithecus anamensis</u> (4 mya)	<u>Australopithecus afarensis</u> (3.6-3.0 mya)	<u>Kenyanthropus platyops</u> (3.5 mya)
<u>Australopithecus ghari</u> (2.5 mya)	<u>Australopithecus aethiopicus</u> (2.5 mya)	<u>Australopithecus boisei</u> (2.3-1.2 mya)
<u>Australopithecus africanus</u> (3-2 mya)	<u>Australopithecus sediba</u> (2-1.5 mya)	Oldowan tools
<u>Homo habilis</u>		
<b>Some Fossil Hunters to know:</b>		
Raymond Dart	the Leakeys	Don Johanson
Tim White		
<b><u>Australopithecus/Paranthropus fossil sites:</u></b>		
Olduvai Gorge	Lake Turkana	Hadar
Taung	Sterkfontein	Laetoli

### Practice Essay Questions:

#### For Exam 2:

1. Compare and contrast the two hypotheses on the origins of the order primates approximately 65 million years ago. Which of the two is best supported by the fossil evidence of the earliest primates? Do you favor one explanation over the other? Why or why not?
2. The best-known Oligocene fossil primates are *Apidium* and *Aegyptopithecus*. Using information from your textbook and lecture, summarize what is known about these species in terms of anatomy, locomotion, and lifestyle. Considering the modern primate classification, indicate which infraorder you would place each of these fossils. Give two specific reasons for your placement.
3. In addition to discovering hominid fossil material, paleoanthropologists attempt to accumulate as much information as possible regarding a variety of aspects of a site. Name and describe three aspects of site reconstruction, and explain the importance of each.
4. What is a fossil? Describe the process of fossilization—include in your response how the location, burial type, and taphonomy affect the number and quality of the remains we find today.
5. How does the geological context in South Africa differ from that in East Africa? How does this difference influence the accumulation and dating of hominid fossils in these two areas? Use one site from each region to illustrate your answer.

#### For Final Exam:

6. What are the ape-like and human-like characteristics of *Australopithecus afarensis*? How do paleoanthropologists know that this species was bipedal (name three actual fossils and explain how each shows bipedalism (use different bones from each fossil)?
7. What is mosaic evolution? Choose a species of fossil that you think demonstrated mosaic evolution well and describe how it does so.
8. Where did the early hominids live? You may want to make a map and practice identifying the different species' locations.
9. What is the evidence for Oldowan toolmaking (what are they made of, where have they been found, what are their features)? Which species have been associated with these tools?