d. Some details of human evolution

i. Known genera: *Homo* *Paranthropus* *Australopithecus* *Ardipithecus* *Orrorin* *Kenyanthropus* *Praeanthropus* *Sahelanthropus*

ii. Oldest hominids are in Africa (6-7 Ma)

iii. Many species in Pliocene-Pleistocene

iv. Some better known hominid fossils

a) *Sahelanthropus tchadensis* (6-7 Ma)

- **Chad, north-central Africa**
- **Late Miocene**
- **oldest known hominid**

b) *Ardipithecus* - 2 species (4.4 & 5.6 Ma)

***Ardipithecus ramidus* - 4.4 Ma; lived in riverine forests**

- **Ethiopia, eastern Africa**
- **tree climber**

c) *Kenyanthropus platyops* (3.2-3.5 Ma)

- **Kenya, eastern Africa**
- **Pliocene**
- **broad, prognathic face & high cheek bones**

d) *Australopithecus* - 6 species (~1.7-4.25 Ma)

- **compared with modern humans, *Australopithecus* have smaller bodies, relatively smaller brains, protruding jaws, & large molar teeth (for chewing plants)**

i) *Australopithecus afarensis*

- **2.9 to 3.9 Ma; eastern Africa**
- **slender, short body**
- **bipedal**
- **lived in groups, usually in forests**
- **probably a fruit & leaf eater**
- **prognathic skull with brow ridge**
- **teeth structure betwen apes & modern humans**

ii) *Australopithecus africanus*

~2 to 3 Ma

- **southern Africa**
- **upright biped**
- **probably a fruit & leaf eater**
- **probably evolved from *Australopithecus afarensis***
- **smaller brow ridge**

iii) *Australopithecus sediba*

- **1.98 Ma**
- **southern Africa**
- **modern-like hands (may have made tools)**
- **420 to 450 cubic centimeter brains (~1/3 of us)**

e) *Paranthropus* (3 species; ~1.2 to ~2.7 Ma)

i) Evolved from *Australopithecus*

ii) Dead-end lineage

iii) *P. boisei*, *P. robustus*, *P. aethiopicus*

- **eastern & southern Africa; all bipedal**
- **robust skulls & sagittal crest (= bony crest atop the skull)**
- **wide cheek bones; large chewing muscles - herbivores**
- **sexually dimorphic (the 2 sexes had different body shapes)**

- some controlled fire
- some made tools (?)
- probably no spoken language

f) *Homo* - ~11 spp. (~2.5 Ma to now)
i) Oldest are in Africa
ii) Evolved from *Australopithecus*
- through time, tooth size & jaw size decrease (= diet change from vegetarian to meat-eating)
- tool makers

iii) *H. rudolfensis*, *H. habilis*, *H. ergaster*

iv) *H. erectus* (1.9 Ma to ~300 ka)
- made stone tools; probably had speech
- ancestors to us
- started in Africa; migrated into Asia
- ~850 to 1100 cubic centimeter brain volume

v) *H. naledi* (236-335 ka)
- South Africa
- mix of *Australopithecus* & *Homo* features

vi) *H. antecessor* & *H. heidelbergensis*
- both probably evolved from *Homo ergaster*
- *H. heidelbergensis* made tools & possibly had speech & buried its dead (= 1st-ever to do that)

vii) *H. neanderthalensis* (200-24 ka)
- Europe & Asia

- ~1600 cubic centimeter brain volume (= larger than us)
- robust, strong bodies
- meat & plant eaters, including cooked vegetables
- buried their dead; controlled fire; made & used tools
- no chin; convex face
- occipital bun (at back of skull); brow ridge (above eyes)
- extinction possibly blamed on Campi Flegrei volcanic eruption at Naples, Italy

viii) *H. floresiensis* (12-74 ka)
- Flores Island, Indonesia
- diminuitive adults (~1 meter tall)
- ~380 cubic centimeter brains (small)
- thick leg bones; no chin
- tools; fire; cooked food

ix) *H. sapiens* (~315 ka to now)
- us
- evolved from *Homo erectus*
- ~1100 to 1400 cubic centimeter brains
- ~no brow ridge; chins; ~flat face
- 1st to make art (cave paintings)

v. Two or more species lived at the same time in Pliocene-Pleistocene

vi. Origin of *H. sapiens* (us)
a) Candelabra/Multiregional Model

b) Noah's Ark/Eve Model (= has nothing to do with Biblical characters)

8. Mass extinctions

a. End-Pleistocene

i. Victims mostly large land mammals (~everywhere except Africa)

ii. North America now has small mammals vs. Africa now has large mammals

iii. Cause debated, but probably due to a combination of factors

a) Climate warming

b) Human overhunting

c) Bolide impact ("bolide" means an asteroid or comet, etc.)

b. Right now

9. Lagerstätten

a. Grube Messel

b. Green River Fm.

c. Baltic amber

d. Clarkia