About Human Evolution

HSP 3U1

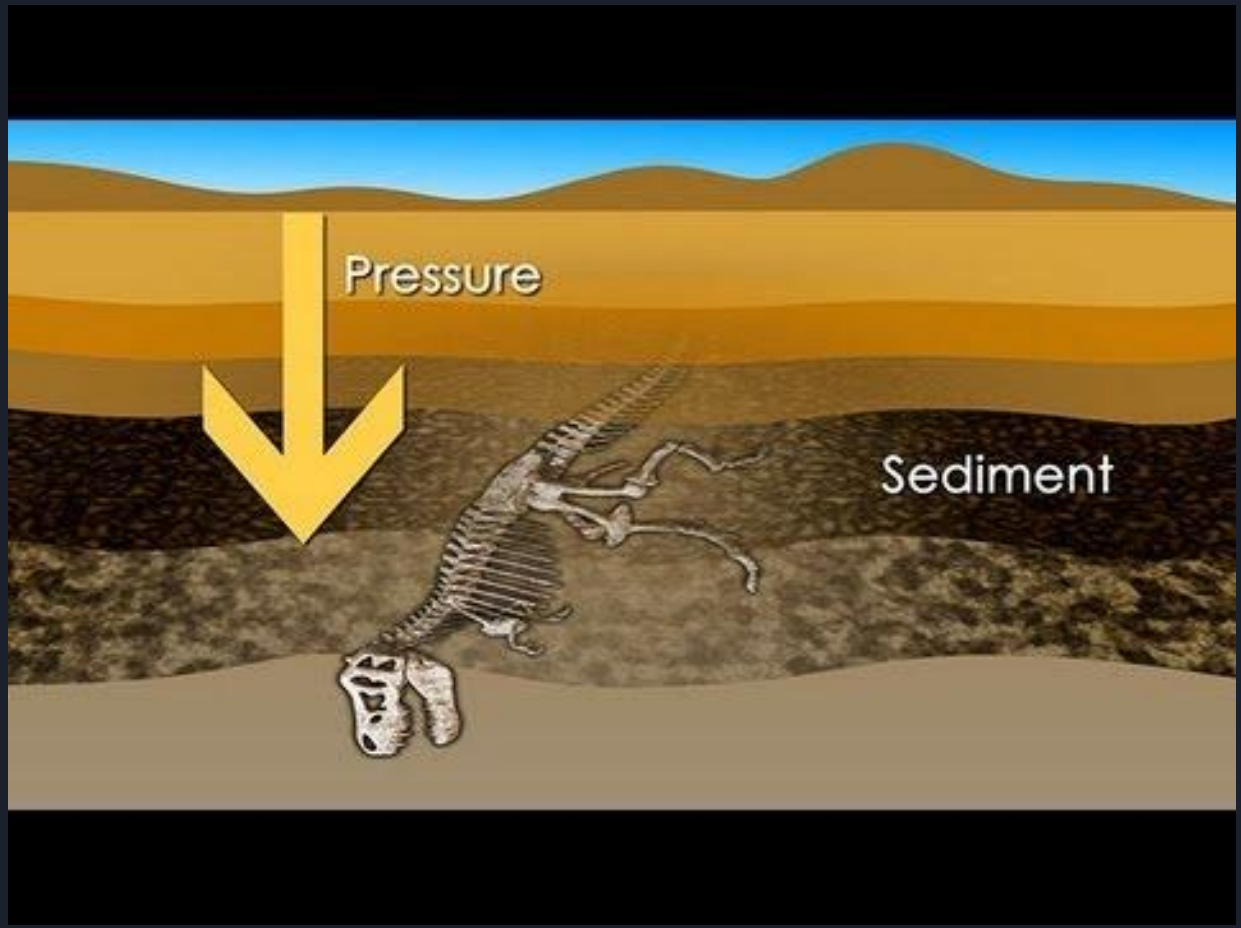
1. What's the difference between a *hominin* and a *hominid*?

HOMININ: the group consisting of modern humans, extinct human species and all our immediate ancestors (including members of the genera *Homo*, *Australopithecus*, *Paranthropus* and *Ardipithecus*)

HOMINID: the group consisting of all modern and extinct Great Apes (that is, modern humans, chimpanzees, gorillas and orangutans plus all their immediate ancestors)

1. What's a *fossil*?

- fossils are preserved remains, or traces of remains, of ancient organisms.
- bones, shells, feathers, and leaves can all become fossils


Pressure
Sediment

Where are the oldest fossils found relating to human evolution?

East Africa consists of:

Kenya
Tanzania
Uganda
Rwanda
Burundi
Ethiopia
Somalia
Mozambique
Madagascar

Ethiopia is currently where the oldest fossils relating to human evolution have been found.

Where are the oldest fossils found relating to human evolution?

THE GREAT RIFT VALLEY

- a Y-shaped scar running through Tanzania, Kenya, and Ethiopia
- where most of the fossil evidence relating to human evolution is found

THE GREAT RIFT VALLEY IN KENYA

3. Ardipithecus ramidus (Ardi)

WHERE & WHEN DID THEY LIVE:

- Ethiopia, Africa; 4.4 million years ago (mya)

IMPORTANT PHYSICAL CHARACTERISTICS:

- Could live in trees; bipedal status unclear; 4 feet tall; 110 lbs

DID THEY USE STONE TOOLS:

- No

SIGNIFICANCE:

- Evidence that the “savannah theory” for bipedalism may not be correct because Ardi lived in a wooded area

1. What are some of the things anthropologists can learn from ancient bones?

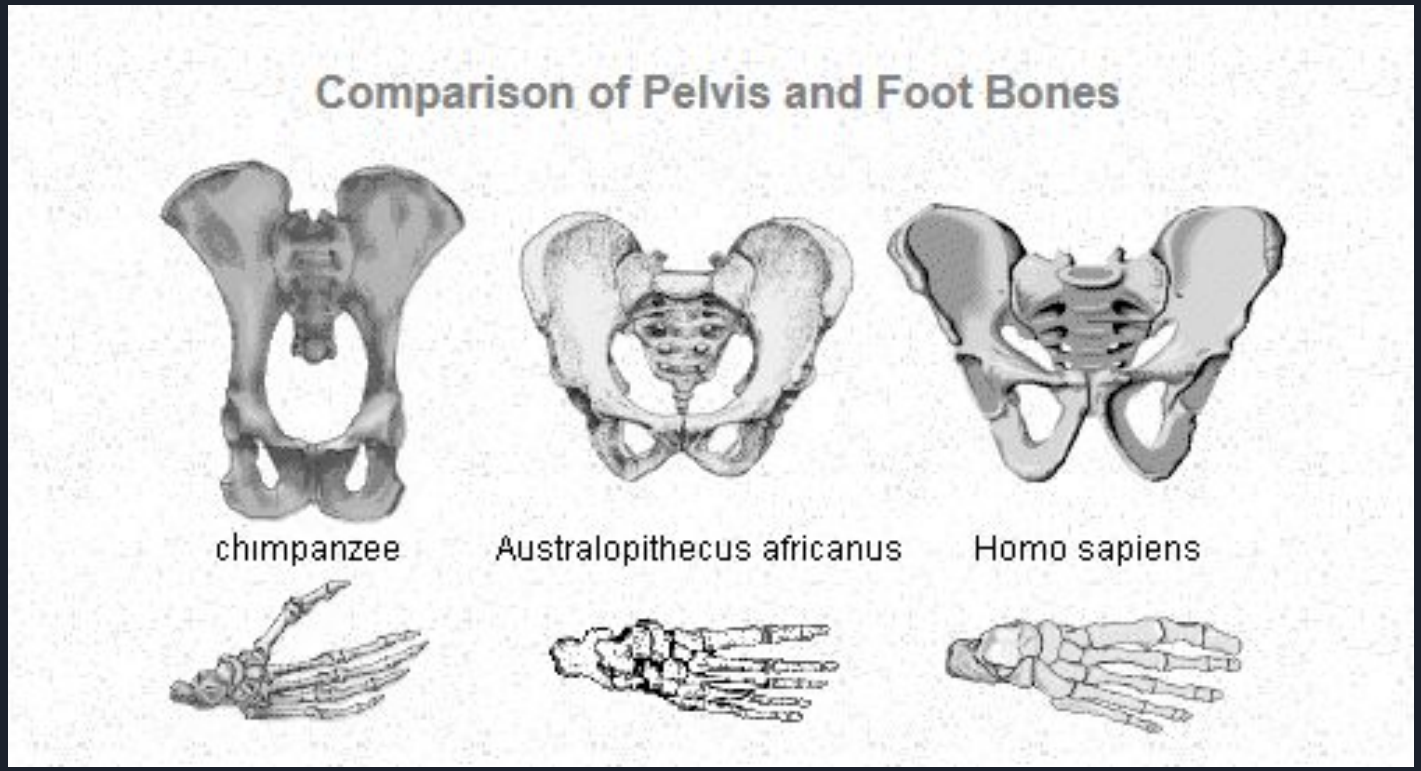
- bipedalism and general movement (degrees of)
- diet (shape of teeth)
- size of skull
- what species they are (or whether they will form an example of a new species)

1. Why is finding fossil evidence important to paleoanthropology?

- because it is a science, proof of theories is necessary
- fossils are all that remain of our ancestors and they help answer questions about how we changed/evolved, when we changed/evolved, where we come from, etc.

1. How do anthropologists determine if a fossil is a hominin?

- one key is to determine if the fossil was a member of a species that could walk upright (bipedal)
- but how do they know that? (pelvis, foot, foramen magnum)



1. What can anthropologists learn from ancient stone tools?

- stone tools help date a site and tell us about the hominins who used them
- stone tools tell us what they were used for (butcher an animal, whittle wood into sharp sticks like a weapon, cut branches, cut tough animal joints)
- stone tools can tell us what they ate, if they hunted, when they started making weapons, etc.

3. Homo habilis (the handyman)

WHERE & WHEN DID THEY LIVE:

- Eastern & southern Africa; 2.4 - 1.4 million years ago (mya)
- Discovered by Louis Leakey

IMPORTANT PHYSICAL CHARACTERISTICS:

- Mix of ape-like and human features; 3 ½ feet - 4 ½ feet tall; 70 lbs

DID THEY USE STONE TOOLS:

- At the time of discovery, it was thought they were the original tool-maker. Newer discoveries have shown tool use slightly before Homo habilis

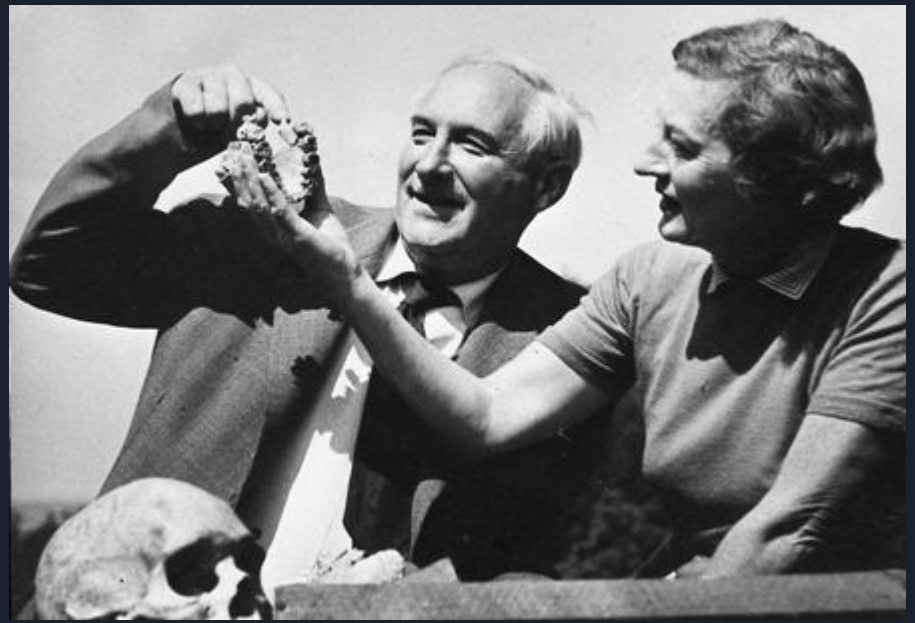
SIGNIFICANCE:

- Shows that tool use was an early evolutionary adaptation

1. Why is bipedalism important when studying human origins?

- bipedalism affected almost every other evolutionary adaptation (where we lived, how we moved, access to food, diet [omnivorous], development of stone technology and all future technology)

2a. What were the contributions of the Leakey family to the understanding of human evolution?



- Mary Leakey found Laetoli footprints which told us bipedalism came before a larger brain; Mary & Louis Leakey found further proof of an African origin when digging in Kenya (Olduvai Gorge)

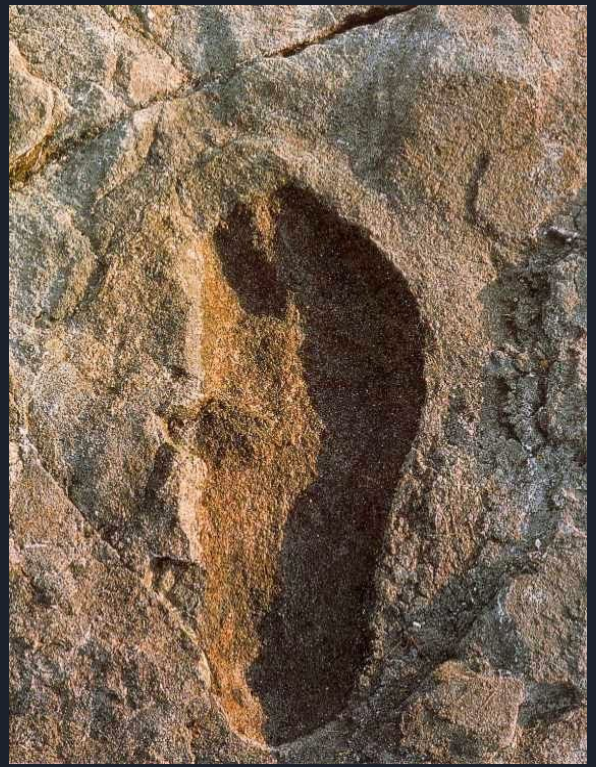
OLDUVAI GORGE

- known as “the cradle of humankind”
- a steep-sided ravine in the Great Rift Valley in Serengeti Plain of Tanzania
- Louis and Mary Leakey began excavations there in 1931, and discovered the footprints at the Laetoli Beds in 1976

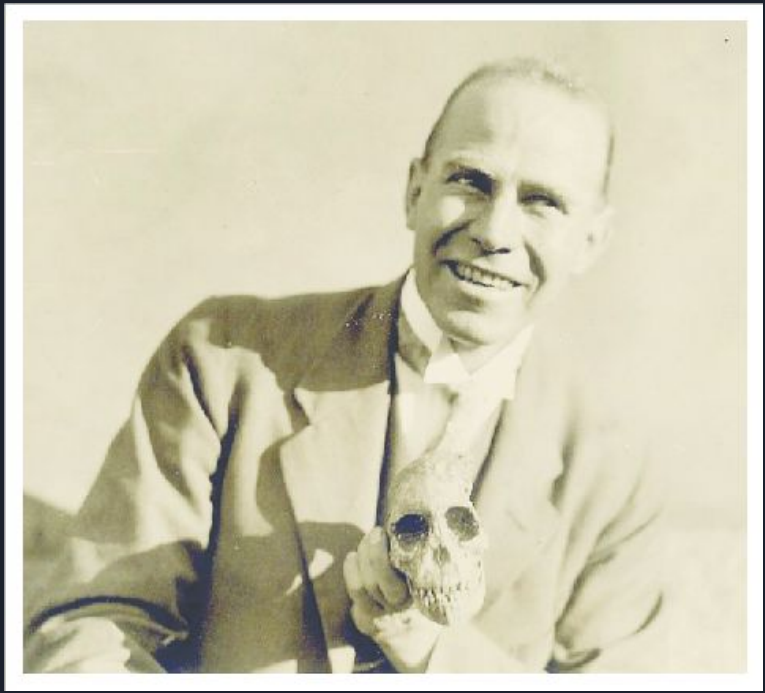
The Laetoli Footprints

If you saw footprints like these, what might you assume about the living thing(s) that created them?

- Laetoli, Tanzania; 3.6 mya
- preserved by volcanic ash
- shows bipedalism
- more human than ape-like
- short (stride)



2b. What were the contributions of Dr. Raymond Dart to the understanding of human evolution?



- first person to provide evidence of an African origin for humanity
- his discovery led to the naming of a new species: Australopithecus Africanus (Taung Child)

3. Australopithecus africanus (Taung Child)

WHERE & WHEN DID THEY LIVE:

- southern Africa; 3.3 - 2.1 million years ago (mya)
- Discovered by Dr. Raymond Dart

IMPORTANT PHYSICAL CHARACTERISTICS:

- Mix of ape-like and human features;
- Males: 4’ 6” tall; 90 lbs/Females: 3’ 9” tall; 66 lbs

DID THEY USE STONE TOOLS:

- No

SIGNIFICANCE:

- Placed our earliest roots firmly in the African continent

2c. What were the contributions of Dr. Donald Johanson to the understanding of human evolution?

- found important link between modern humans and apes --- Australopithecus Afarensis --- Lucy
- 3.18 million years old
- beginnings of bipedalism;
- which human-like characteristics came first, second, third (ie. bipedalism vs speech)

3. Homo neanderthalensis (Neanderthal)

WHERE & WHEN DID THEY LIVE:

- Europe & southwestern to central Asia; 400,000 - 40,000 years ago

IMPORTANT PHYSICAL CHARACTERISTICS:

- Shorter & stocky; strong physique; excellent olfactory senses
- Males: 4’ 6” tall; 90 lbs/Females: 3’ 9” tall; 66 lbs

DID THEY USE STONE TOOLS:

- Yes. Used a diverse set of sophisticated stone tools

SIGNIFICANCE:

- Our closest extinct relative; more recent discoveries show signs of culture (burying the dead, wearing jewlery, etc.)

4a. Why are Neanderthals extinct? COMPETITION THEORY

- Neanderthals left Africa before Homo sapiens
- Neanderthals were excellent hunters, but specialization can be a detriment to survival
- Neanderthals experienced competition from Homo sapiens that were more diverse in their skills
- As climate changed, food became more scarce, Homo sapiens had more diverse strategies for eating than Neanderthals

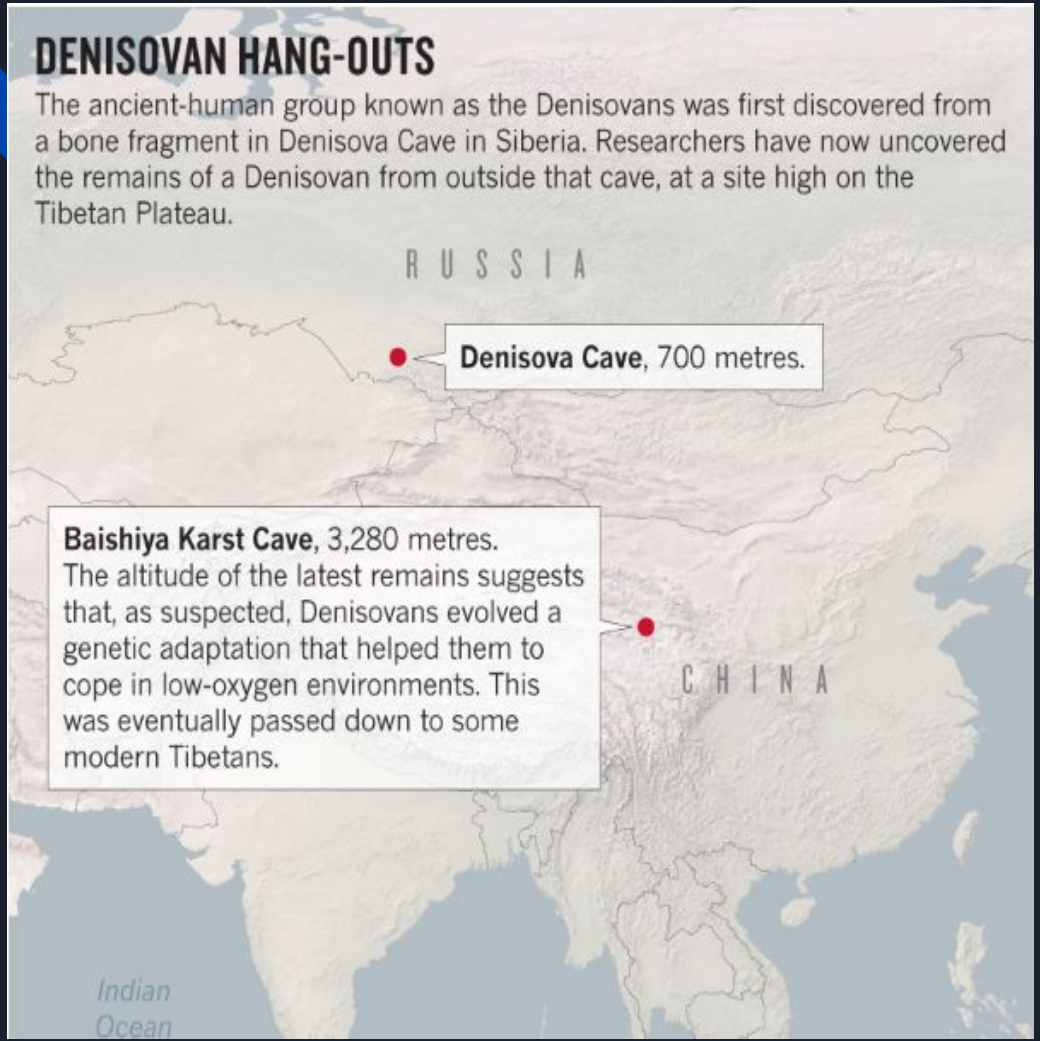
4b. Why are Neanderthals extinct? INTERBREEDING

- When our ancestors left Africa around 70,000 years ago, Neanderthals and Denisovans were already in what we call Europe and West Asia for about 250,000 years
- Everyone alive today who has ancestry from outside of Africa has Neanderthal DNA so we know they interbred

4c. Why are Neanderthals extinct?
CLIMATE CHANGE & ENVIRONMENTAL FACTORS

- when scientists test for major environmental events in our past, they coincide with massive declines in population of Neanderthals
- although Neanderthals were able to build fire and stay in caves to protect them from cold spells, they had difficulty adapting to the changes in climate that affected their ability to find food
- along with this, fertility rates dropped
- were a population of only about 70,000

So, seriously…. why are Neanderthals extinct?



5. Who were the Denisovans?

- the first fossils of these archaic humans were found in a cave of the Altai Mountains of Siberia, but now believed to have lived widespread across the world and at high altitudes

5. Who were the Denisovans?

- Homo sapiens interbred with them and it's believed they gave us important immune cell types
- don't know exactly when and where they interacted, but people from modern Asia and Oceania carry traces of Denisovan DNA

So how did we achieve world dominance?

Leaving Africa is perhaps the most important event in our evolutionary history

MULTI-REGIONAL HYPOTHESIS:

- A species of human ancestor dispersed throughout the globe, and modern humans evolved from this predecessor in several different locations

OUT OF AFRICA THEORY:

- Modern humans evolved in Africa before they left it to populate the world

Homo erectus (Homo ergaster) (Upright Walking Man)

WHERE & WHEN DID THEY LIVE:

- Northern, eastern, southern, western Africa & east Asia (China & Indonesia); 1.89 - 110,000 years ago

IMPORTANT PHYSICAL CHARACTERISTICS:

- Oldest known early humans to have modern human proportions
- 4’ 9” - 6’ 1” tall; 88 - 150 lbs

DID THEY USE STONE TOOLS:

- Yes. Earliest use of handaxes;

SIGNIFICANCE:

- Believed to be the first to leave Africa and went to Asia first

Our history is not a single branch but a tree