

Name: \_\_\_\_\_

## Assignment 1: Evolutionary Trends in Hominin Skulls

Humans and African apes share a common ancestor, and around 5-7 million years ago, the human ancestors split from the other Hominids, becoming bipedal. Eventually hominins developed tools, control of fire, and large brains. Morphological changes to the hominin skull can provide paleoanthropologists with the clues necessary to answer when and how these events occurred. You will explore and discuss some of those trends here by examining differences in the skulls of a chimpanzee, an *Afarensis sp.*, an *Erectus sp.*, and a modern human.

Using the “free assignment” in the online 3D skull program from the University of Denmark ([accessible here](#)), you will use the tools provided to take measurements and make observations on the following traits in all 4 different skulls:

- Dental arch size/shape
- Tooth size/shape
- Cranial height and length
- General musculature
- Foramen magnum location
- Snout length
- Shape/size of jaw/chin
- Jaw musculature
- Brow ridges
- Subnasal prognathism

Use the space provided below to record your measurements and answer the associated questions.

**Please hand-in your completed assignment at the beginning of class on February 12<sup>th</sup>.**

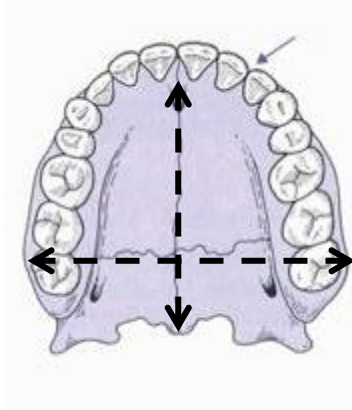
Play around with the program a bit first to familiarize yourself with its features. You don't have to use any of the pre-made assignments, but feel free to examine them.

You can watch a tutorial video here: [http://snm.ku.dk/english/school\\_services/high\\_schools/e-learning/human\\_animal/videoguide/](http://snm.ku.dk/english/school_services/high_schools/e-learning/human_animal/videoguide/) if you are having difficulty.

Use the gridlines to help you keep your lines straight and in the correct plane where necessary. If you can't get the program to run, try a school computer. If that doesn't work, let me know!

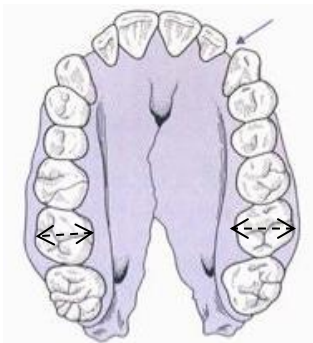
You may work with others in the class, but everyone must hand in their own assignment.

Record the following measurements on the upper jaw (6 marks):



Dental Arch				
	Chimpanzee	Afarensis	Erectus	Sapiens
Length				
Width				
Ratio (L/W)				

Record the following measurement on the 2<sup>nd</sup> molar (middle molar) of the LOWER jaw (upper shown) (2 marks):



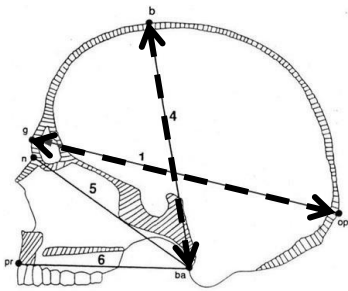
Teeth				
	Chimpanzee	Afarensis	Erectus	Sapiens
Width				

1) What does the ratio of jaw length:width tell you about changes to the shape of the dental arch over time?(2 marks)

2) What is happening with the size of the molars over time? (2 marks)

- 3) What do the above changes to the teeth and jaw suggest? What could be some adaptive reasons for these changes? (3 marks)

Record the following measurements on the cranium. (Note: you can measure *through* the skull by holding the mouse button and rotating as you drag the ruler, use the guidelines as a guide) (6 marks):

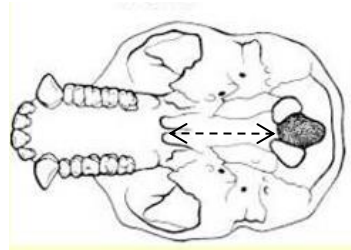


Cranium				
	Chimpanzee	Afarensis	Erectus	Sapiens
Length				
Height				
Ratio (L/W)				

- 4) What is happening to the shape of the skull over time? Why are these changes occurring? (2marks)

- 5) Is there a trend in the size and shape of a brow ridge (if present)? If yes, describe what is happening over time. (2 marks)

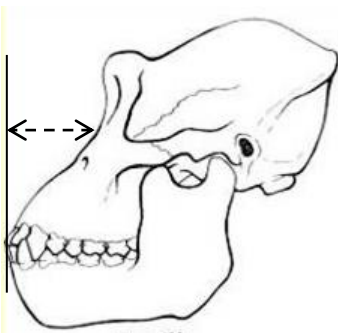
Record the following measurements on the bottom of the cranium. Make sure to remove the jaw first. (Note-this will be on an angle, measure from the front of the foramen magnum up to the base of the maxilla) (2 marks):



Foramen Magnum				
	Chimpanzee	Afarensis	Erectus	Sapiens
Length				

6) What is happening with the foramen magnum placement over time? What are the implications of this trend? (3 marks)

Record the following measurements on the craniums. Use the gridlines. (2 marks):

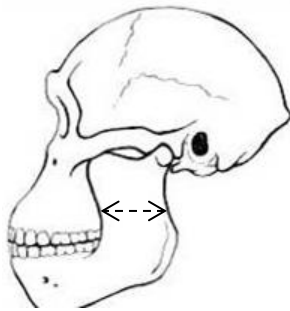


Snout				
	Chimpanzee	Afarensis	Erectus	Sapiens
Length				

7) What do changes in the snout length tell you? (2 marks)

8) What trend do you see with subnasal prognathism? What does this suggest to you about the skulls? (2 marks)

Record the following measurements on the lower jaw at its most narrow point (2 marks):

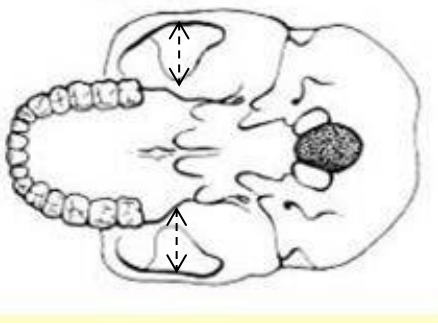


Jaw				
	Chimpanzee	Afarensis	Erectus	Sapiens
Width				

9) Describe what is happening to the jaw between species. What do these changes suggest? (2 marks)

10) Do any of the skulls have a chin? If so, which one? (2 marks)

Record the following measurement on the cranium. Make sure the lower jaw is removed. Try to get as straight a line as possible between the zygomatic arch and side of the head (2 marks):



Jaw Musculature				
	Chimpanzee	Afarensis	Erectus	Sapiens
Width				

11) What does the size of this space tell you? What is happening between the skulls and what does that indicate? (3 marks)

12) What do you notice about changes to general muscle attachments between the skulls? What could these changes mean adaptively? (2 marks)

13) What are the cranial capacities of these 4 species? What does this indicate? (2 marks):

Cranial Capacity				
	Chimpanzee	Afarensis	Erectus	Sapiens
cc				

14) What other trends do you notice between the skulls (name 2)? What are the adaptive implications of these trends? (4 marks):

Final Grade: /55

Comments: