LAB # ____Hominid

Lab Instructor_____ Name_____
Date _____ Period_____

Objective: To compare hominid skulls

******Use full sentences when answering all questions.******

Read the entire lab description in this lab sheet and, if available, the Tiger textbook pp. 310, 316-317.

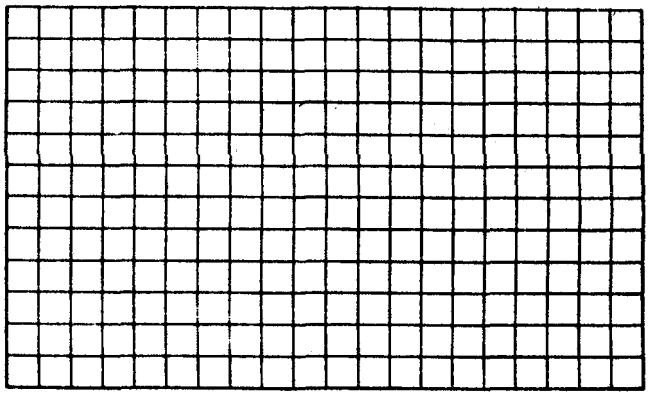
Background

When paleontologists discover fossils, they determine whether they have discovered fossils of recent or early organisms. A determination of the kind of organism the fossil represents is made. If a skull were discovered and classified as a primate skull, the next step could be to determine whether it was from an ape or a human. Fossil remains provide a record of early human and other primates (lemurs, monkeys and apes). By taking careful measurements and comparing with the basic knowledge of primate fossils we can make conclusions.

Pre-Lab Prepare a bar graph of hominid cranial capacity using the information in the table below.

Cranial Capacity of Hominids	
Species name	**Cranial capacity***
Australopithecus afarensis	375–400 cm^3 (22.5–24 $in.^3$)
Australopithecus africanus	400–500 cm^3 (24–30 $in.^3$)
Australopithecus boisei	650 cm^3 (39 $in.^3$)
Australopithecus robustus	530 cm^3 (32 $in.^3$)
Homo habilis	700 cm^3 (42 $in.^3$)
Homo erectus	1000 cm^3 (60 $in.^3$)
Homo sapiens (Neanderthal)	1400 cm^3 (84 $in.^3$)
Homo sapiens (modern human)	1350 cm^3 (81 $in.^3$)

*Approximate values



LAB ----------

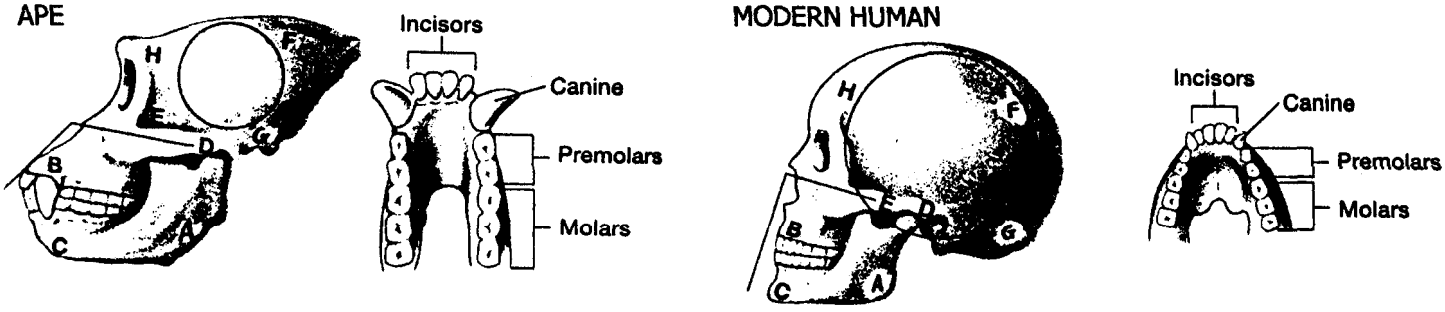
Suggested Materials

protractor

Procedures and Observations

A. *Ape skulls and human skulls*

Examine the diagrams of the skull /jaw of an ape and a human. Take measurements as explained below to complete Table 1.



1. Cranial capacity: use the circles drawn on the skulls to estimate brain volume, or cranial capacity. Measure the radius of each circle in centimeters. Cube this number and multiply the result by 1000 to calculate the approximate life-size cranial capacity in cubic centimeters for the given scaled diagram. A large brain capacity is characteristic of modern humans.
2. Lower face area: measure A to B and C to D in centimeters for each skull. Multiply these 2 numbers together, and multiply the product by 40 to approximate the life-size lower face area in square centimeters for the given scaled diagram.
3. Brain area: measure E to F and G to H in centimeters for each skull. Multiply these 2 numbers together, and multiply the product by 40 to approximate the life-size brain area in square centimeters for the given scaled diagram.
4. Jaw angle: note the 2 lines that come together near the nose of each skull. Use a protractor to measure the inside angle made by the lines and to determine how far outward the jaw projects. A jaw angle of approximately 90° is characteristic of *Homo sapiens*.
5. Brow (supraorbital) ridge: this is a bony ridge above the eye socket. Indicate its presence or absence in each skull.
6. Teeth: indicate the number of each kind of tooth in the lower jaw.

Name_____

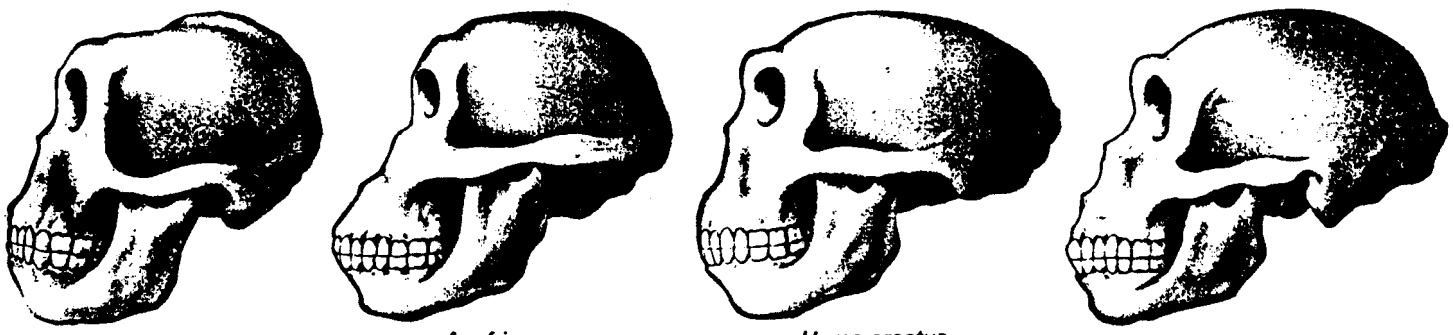
Period_____

SPECIES	Cranial capacity (cm^3)	Lower face area (cm^2)	Brain area (cm^2)	Jaw angle (degrees)	Brow ridge	Teeth
Ape						
Modern Human						

TABLE 1. Collected data for hominid skull measurements and observations

B. *Fossil Hominids*

Examine the diagrams of the 4 fossil hominid skulls. Use the previous measuring techniques to complete Table 2.



A. robustus *A. africanus* *Homo erectus* Neanderthal

SPECIES	Cranial capacity (cm^3)	Lower face area (cm^2)	Brain area (cm^2)	Jaw angle (degrees)	Brow ridge
Australopithecus robustus					
Australopithecus africanus					
Homo erectus					
Neanderthal					

TABLE 2. Calculated data for hominid skull measurements and observations

Conclusions

1. Using your data, predict the order in which the four hominids shown above reportedly evolved. Explain your prediction.

2. Suppose you find a distorted fossil lower jawbone and note that there are 16 teeth in it. Explain why this information may or may not be helpful in determining whether the fossil is from a modern human or other species.

Notes/Calculations Show a sample calculation of how cranial capacity is determined for any skull in this activity. Identify which hominid skull you are using.