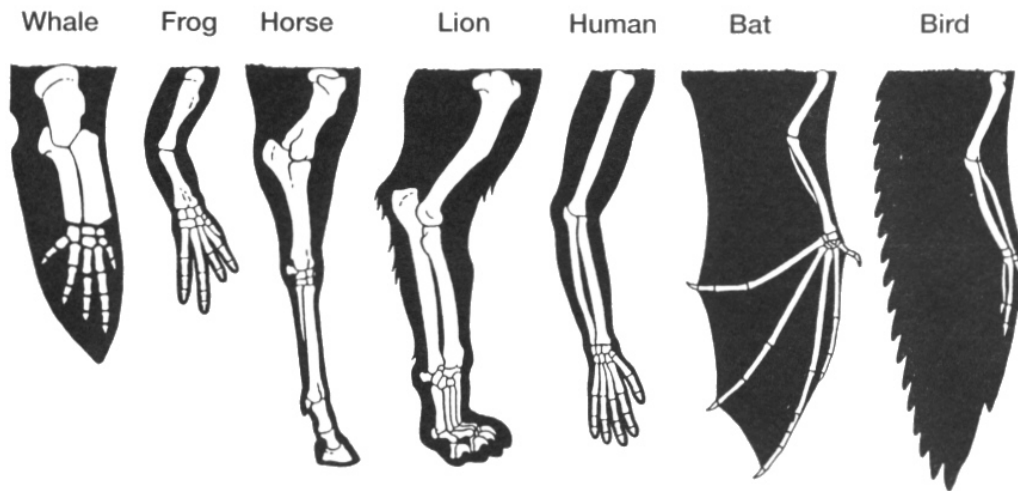


ACTIVITY #1: Limb Homology

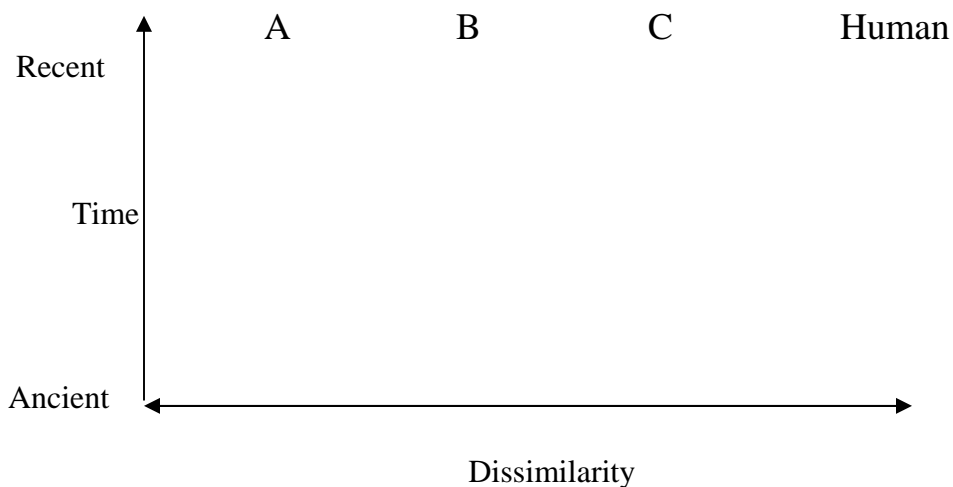
1. Name the bone or bones labeled 153 in the specimen behind the display case.
2. On the organisms figured below, circle the bone or bones that you think are homologous to the bone labeled 153. How did you determine what bones were homologous?



3. From the evidence supplied at this activity and around the room at other activities, what bone or group of bones of the forelimb show the most variation? Why do you think they are so variable?
4. What is the function of specimen A? Why?

ACTIVITY #3: Ungulate Limbs

1. The bone labeled #1 on Specimen C is homologous to which labeled bone on (Write down the appropriate Letter):
 - a. the cow leg =
 - b. the horse leg =
 - c. the human skeleton =
2. Find the “heel bone” on the human and then the homologous bone on the horse. Using the “heel bone” as a landmark to guide you, list the phalanx bones that are completely lost in the horse (specimen A). Use the Roman numeral system seen in Figure 3.2.
3. In specimen A, which bones are not lost, but are extremely reduced?
4. In specimen A, which bone has become enlarged and prominent?
5. Out of the four organisms (represented by the three leg specimens and human skeleton), which are the most closely related? Draw a phylogenetic tree representing your proposed relationships. (Hint: Start by writing down the taxa. Connect the two most closely related).



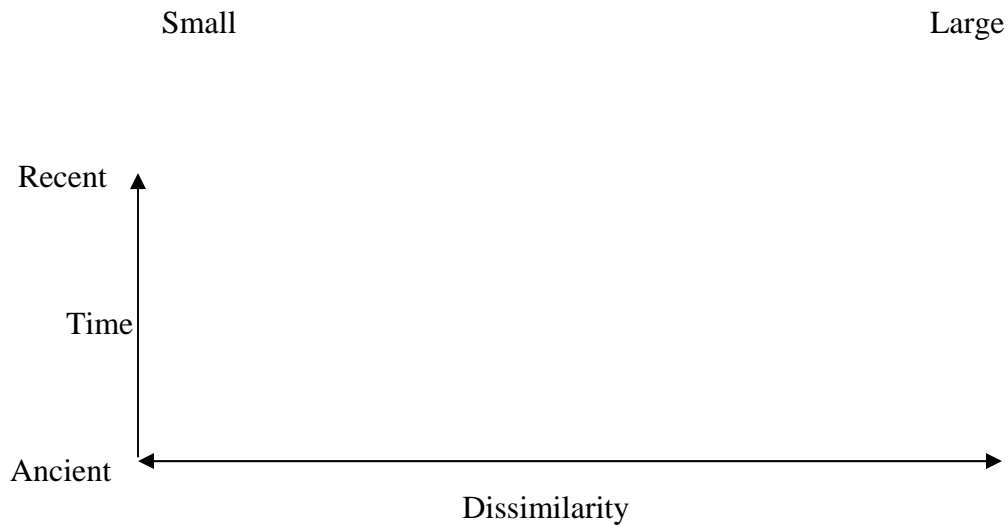
ACTIVITY #4: Hominoids and out-group.

This ACTIVITY has 7-8 skulls; 1.) human, 2.) gorilla, 3.) chimpanzee, 4.) baboon, 5.) gibbon, 6.) orangutan 7.) lemur and 8.) dog, which represents a distantly related out-group. The following questions will help “determine character polarity” for Foramen magnum (FM) location. That is to say, by using a distantly related species (canine in this case) a researcher can make an educated guess as to which character states are ancestral (older) and which are derived (more recent). Derived traits are used to help determine a new branch on a phylogenetic tree. Ancestral traits are traits shared by all taxa or once shared. Derived traits are new and can represent a new species diverging away from a common ancestor. The character in this case was Foramen magnum location and the character states were medial vs. distal.

1. Carefully pick up skulls and locate the Foramen magnum (FM) on all specimens. It is the empty, round hole (or filled in with black casting) on the underside of the skull. What is the function of the FM?
2. If the dog (labeled E) is the most distantly related taxon among all the specimens, what do you think is the more ancestral character state, a FM located more medially towards the center of gravity or a FM located more distally further away from the center of gravity?
3. Considering that bipedalism is related to the location of the FM, do you think bipedalism is an ancestral or derived trait?
4. List two other characters useful in analyzing skulls and identify the ancestral state for each?

ACTIVITY # 5: Hominids – Bi-pedal, non-ape lineage including *Homo sapiens*

1. Draw a phylogenetic tree of the specimens based solely on the character “size of skull”. Use the capital letters as taxa names.



2. Do you think overall size is a useful character? Why or why not? What if specimen D is an infant?
3. Draw a final tree based on your gut instincts as to the real relationship between the taxa represented by these specimens.
4. What character(s) most influenced your tree branching pattern?