



MAMMALOGY LAB 1

CHARACTERISTICS OF

MAMMALS -

STRUCTURE & FUNCTION OF

SKULLS AND TEETH

I. IDENTIFYING SKULL FEATURES

Select a complete skull (cranium & mandible) from the classroom collection. Find the following bones and features on the skull. Follow the text on pages 6-9 in the lab manual as reference.

Check them off as you find each one. (Note not all bones listed below will be found on all skulls).

On the **Cranium** Identify:

Nasals
Frontals
Orbits
Postorbital process
Parietals
Foramen magnum
Occipital condyles
Premaxillae
Maxillae
Temporal fossae
Jugal
Zygomatic process of squamosal

Squamosal
Mandibular fossa
Auditory bullae
Alisphenoid
Basioccipital
Basisphenoid
External auditory meatus
Infraorbital foramen
Lacrimal
Orbitosphenoid
Presphenoid
Vomer

On the **Mandible** Identify:

Dentary
Mandibular symphysis
Ramus
Mandibular condyle

Coronoid process
Angular process
Masseteric fossa

II. SKULL MORPHOLOGY

Measure the skulls of the **opossum**, **rhesus macaque**, **horse**, **mink**, **human**, and **raccoon** along the dimensions listed below. List the skulls in rank order and be sure to include the measurements as part of your answer.

- ◆ Mandibular length, excluding teeth (p. 11, fig. 2.4 D–E)

- ◆ Length of braincase (pg. 10, fig 2.3 I–M)

- ◆ Ratio of length of braincase to length of rostrum (pg. 10, fig. 2.3 L–I)

Compare the positions of the orbits in the **chimpanzee**, **cat**, **raccoon**, **woodchuck**, and **deer** skulls. (This is a qualitative comparison, no measurements are necessary.)

- ◆ The woodchuck and the deer are both potential prey for large predators, but the position of their orbits is slightly different. Suggest a reason for this difference.

- ◆ In what way is the forward facing position of the chimpanzee's orbits important for its lifestyle other than improved binocular vision for prey capture?

- ◆ Based on the position of its orbits, is the raccoon more often the predator than the prey? Explain.

Examine the placement of the foramen magnum of the **opossum**, **rhesus macaque**, **human**, and, **cow** skulls. Pay special attention to the location on the skull and the angle of entry of the spinal cord relative to the plane of the tooth row.

- ◆ What does this tell you about the postures of each species?

III. TEETH

- ◆ How does the system of tooth replacement differ between the carnivorous **cat** (*Felis catus*) and the herbivorous **manatee** (*Trichechus manatus*)?

- ◆ What is a possible reason for this difference?

- ◆ Write the dental formulae for the **opossum**, **cat**, and **porpoise** (e.g. $I\ 3/5\ C\ 1/1\ P\ 4/4\ M\ 2/3 = 42$).

opossum -

cat -

porpoise (group the cheek teeth [**P+M**]) -

- ◆ Write a full dental formula for the **mink** that shows which teeth are absent in comparison to the primitive formula for placental mammals (See p. 20 and remember that the carnassial pair in adults is always the last upper premolar [**P**] and the first lower molar [**M**]).

- ◆ What is your dental formula (look in a mirror or have your lab partner check if necessary)?

IV. Common Measurements of the Cranium and Mandible

Lab Partner's Name:

You and your partner should select a skull from the classroom collection and make the measurements listed on the chart below with the calipers and rulers provided. Consult pages 10 & 11 in the lab manual for descriptions of these measurements. Each partner must take an independent set of measurements to test for **accuracy**. And then a third set of independent measurements should be taken by one group member to test for **precision**. Make all measurements to the nearest tenth of a millimeter (when possible).

Be *extremely* careful and gentle with the skulls. Do not close the calipers too tightly. If you notice that any pieces have broken, cracked, or fallen off of the skull you are working with, please notify your TA immediately, so repairs can be made.

Scientific Name:

Common Name:

	Your Measurement	Partner's Measurement (Accuracy)	Third Measurement (Precision)
Condylobasal Length			
Greatest Length of the Skull			
Breadth of Braincase			
Least Interorbital Breadth			
Zygomatic Breadth			
Maxillary Tooth Row			
Palatal Length			
Tympanic Bulla Length			
Tympanic Bulla Width			
Mandible Length			
Mandibular Tooth Row			
Diastema (if present)			

◆ What is the dental formula of the species you have measured?

◆ What type of molars does it possess? (Lophodont, Selenodont, or Bunodont?)