Unit 7 Notes #2 : Classes - AVES and Mammalia

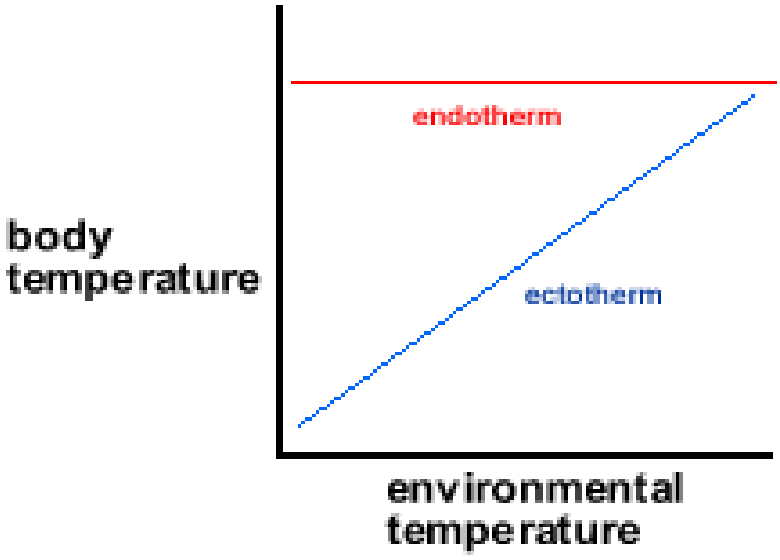
A) Temperature Control:

- Both birds and mammals have a built-in mechanism for controlling their body temperatures. Animals with this ability are classified as being "endothermic" or more commonly "warm-blooded".

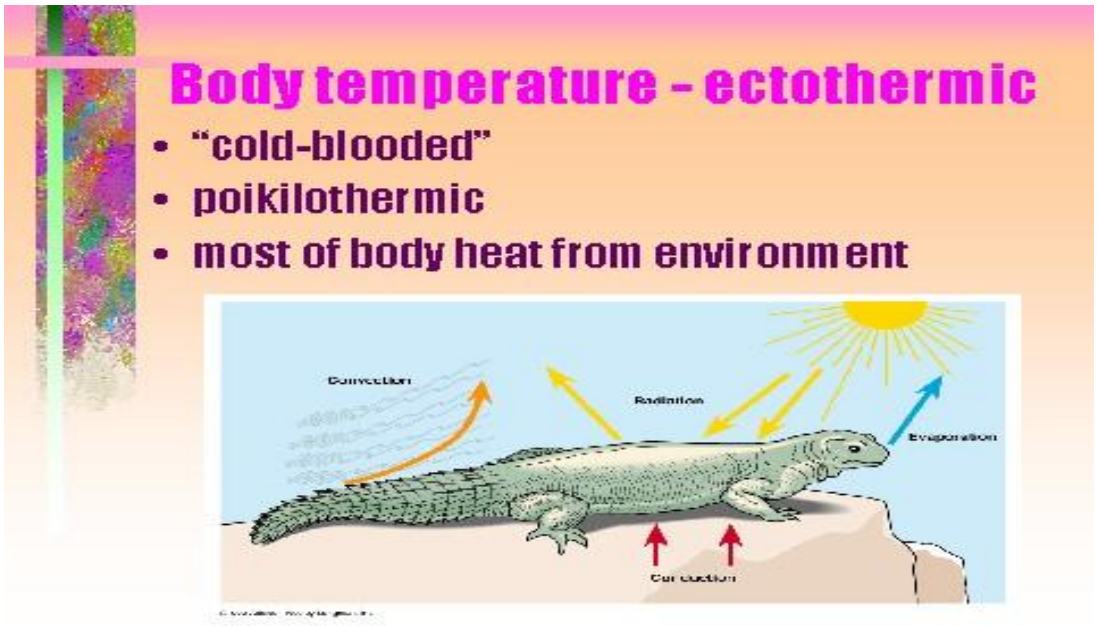
- They can maintain a constant body temperature regardless of the temperature of their environment (to a certain point).

- Being endothermic has allowed birds and mammals to adapt so that they can remain active in colder climates/seasons. Many are successful in living in arctic and temperate zones.

- They have higher metabolisms, but must eat far more often than "cold-blooded" animals.



- All other animals are classified as being "ectothermic" also called "poikilothermic", they must get their heat from outside.



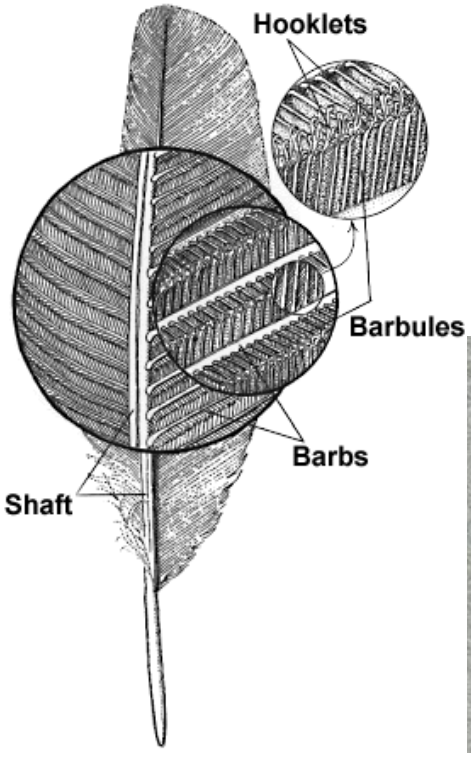
<u>B) Birds – "AVES"</u>

- Birds are endothermic reptile-like animals with an outer covering of feathers, two forelimbs usually adapted for flight and two hind-limbs specialized for perching, swimming, running etc. Flying birds have hollow but strong bones.

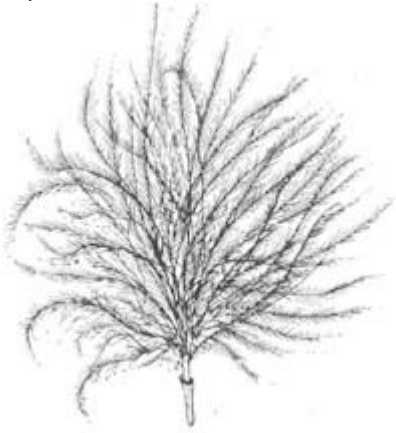
- Scaly skin similar to reptilian skin found on feet.

- Feathers aid in flight and in insulating the bird.

- Birds have several different kinds of feathers:
a) Contour feathers: Used for flight.



b) Down feathers : Used for insulation.



c) Powder feathers: Used for waterproofing.

i) <u>Feeding</u>: Birds have a very high metabolic rate so they must eat large amounts of food.

- Their beaks are usually perfectly adapted to function as an appropriate tool for obtaining the food they eat.

- The digestive system of birds contains a crop (storage) and gizzard (grinding) along with the usual digestive structures.

<u>ii) Respiration and Circulation:</u>

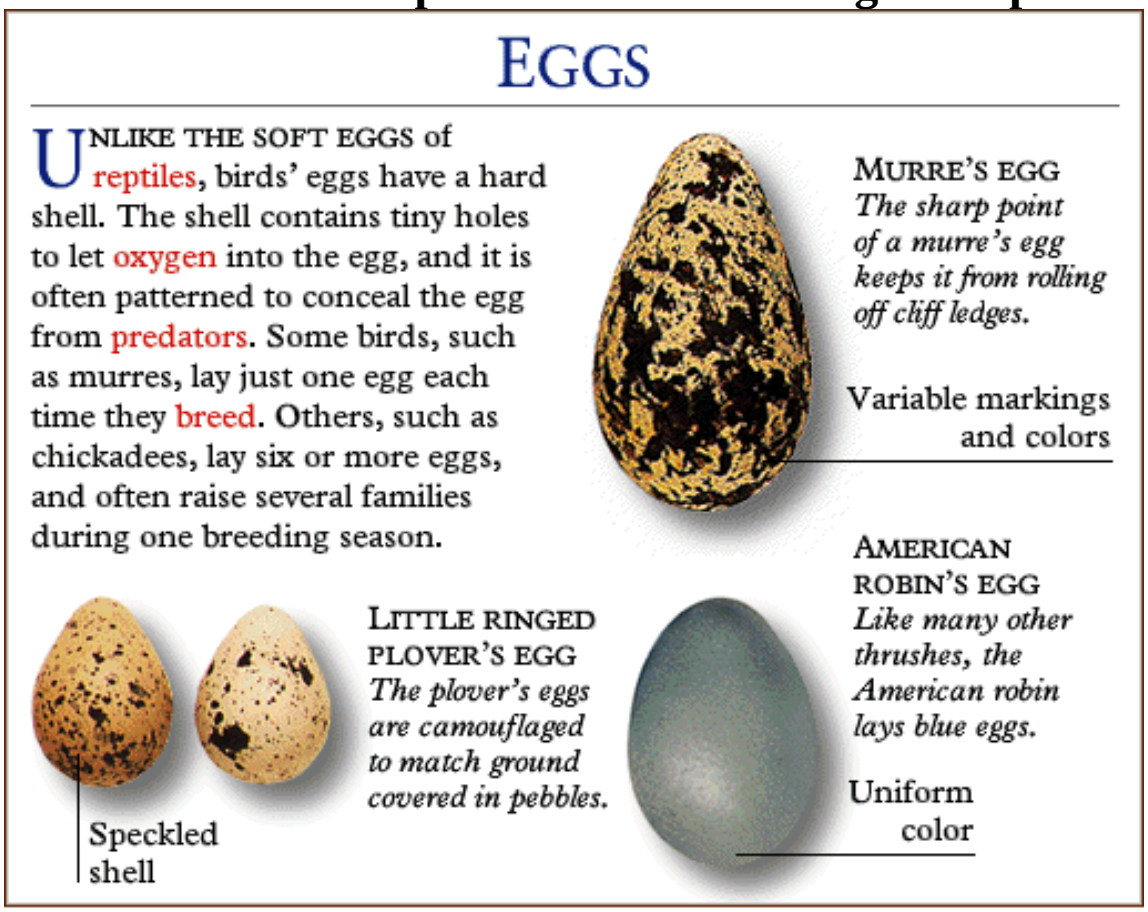
- Birds have the most efficient lungs of any animal, probably due to their high metabolic demands for oxygen. They have the ability to diffuse oxygen into the blood through their lungs when they inhale and also while they exhale.

- Birds also possess a four-chambered heart, with two separate circulatory loops; one half of the heart pumps only deoxygenated blood to the lungs, the other half of the heart receives the oxygenated blood from the lungs and pumps it out to the rest of the body. Blood does not mix between the two halves.

<u>iii) Reproduction:</u>

- Birds use internal fertilization, birds are oviparous with eggs being protected by a hard shell.

- Birds usually incubate (warm) their eggs during the remainder of development before hatching takes place.



C) Mammals – "MAMMALIA":

- Mammals are endothermic animals extremely specialized at maintaining a constant body temperature.

- They use hair/fur or fat to help insulate and most possess sweat glands to help them lower their body temperature when required.

- Almost all mammals are viviparous (born alive), with the exception of the monotremes (platypus, echidna etc)

- Female mammals have mammary glands to produce milk for nourishing their young.

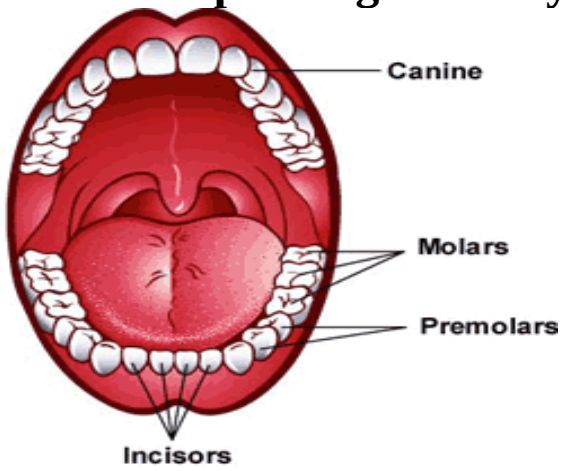
Most Primitive → → → Most Advanced

Monotremes → Marsupials → Placental Mammals

i) Feeding:

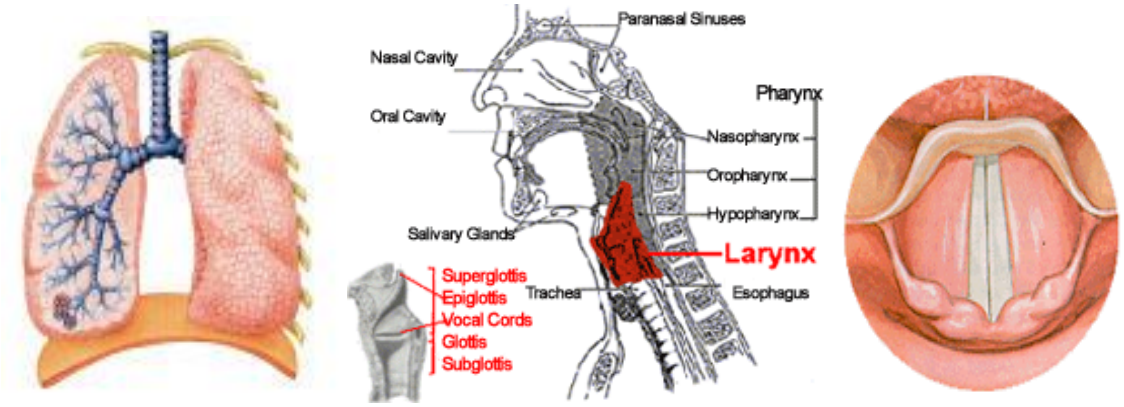
- Mammals also require large amount of food to maintain their high metabolism.

- Mouth contains various types of teeth, the size and number of each type of tooth varies from one species to another depending on the type of diet they have.

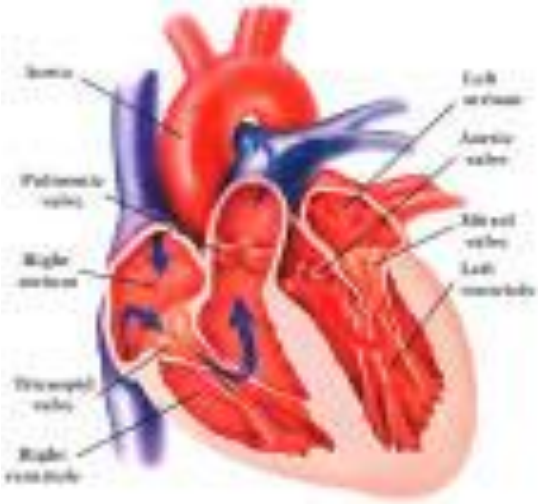


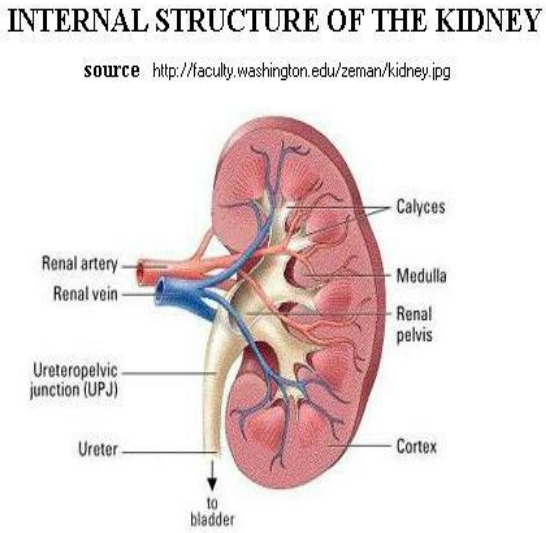
ii) Respiration / Circulation / Excretion:

- Very similar to birds, many can exhale air past vocal cords (larynx) to produce various types of sounds, often used for communication.



- Mammalian heart is the most advanced heart, with a double circuit system (pulmonary –lungs and systemic – rest of body).





- Most highly developed kidneys of all vertebrates. Kidneys filter nitrogenous wastes from blood, and help maintain the balance of salts and sugars.

iii) Reproduction:

a) *Monotremes* : (Oviparous) Use internal fertilization, but lay reptilian-like eggs and incubate them through their development. When offspring hatch the female nurses them from her mammary glands.

ECHIDNA ←

PLATYPUS ↓

b) *Marsupials* : (Viviparous) Fertilized egg develops into embryo that receives nourishment from a yolk sac rather than from a placenta. The yolk sac does not last long enough for complete development, so the embryo leaves the womb (uterus) and must finish its development in its mother's pouch (marsupium) where it latches on to the mother's nipple.

c) *Placentals:* (Viviparous) Protective membranes to the outside of the embryo join to the tissues of the mother's uterus to form a placenta. The placenta forms a connection between the mother's circulatory system

(carrying oxygen and nutrients) and the fetal circulatory system. The mother's blood and the fetus' blood do not mix, only nutrients, oxygen and wastes can cross over. The developing fetus remains in the mother's womb for a duration called the "gestation" period.

PLACENTALS

MARSUPIALS