Ministry of Higher Education
and Scientific Research
University of Ishik
College of education
Department of Biology

Practical comparative anatomy of chordate
Lab.5
(4th Grade)

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Group: Vertebrata

Subphylum : Gnathostomata

Super class : Tetrapoda

Class : Aves

- **Some characteristics of Avis class:**

1. The members of class aves are commonly known as birds.
2. Body is divided into four region ; head ,neck, trunk and tail.
3. **Feathers cover .**
4. Horny scales cover some parts of body like legs and beak.
5. **Each jaw covered with a keratinized sheath, forming a beak.**
6. Thin integument of epidermis and dermis.

7.**Has wings for aviation.**

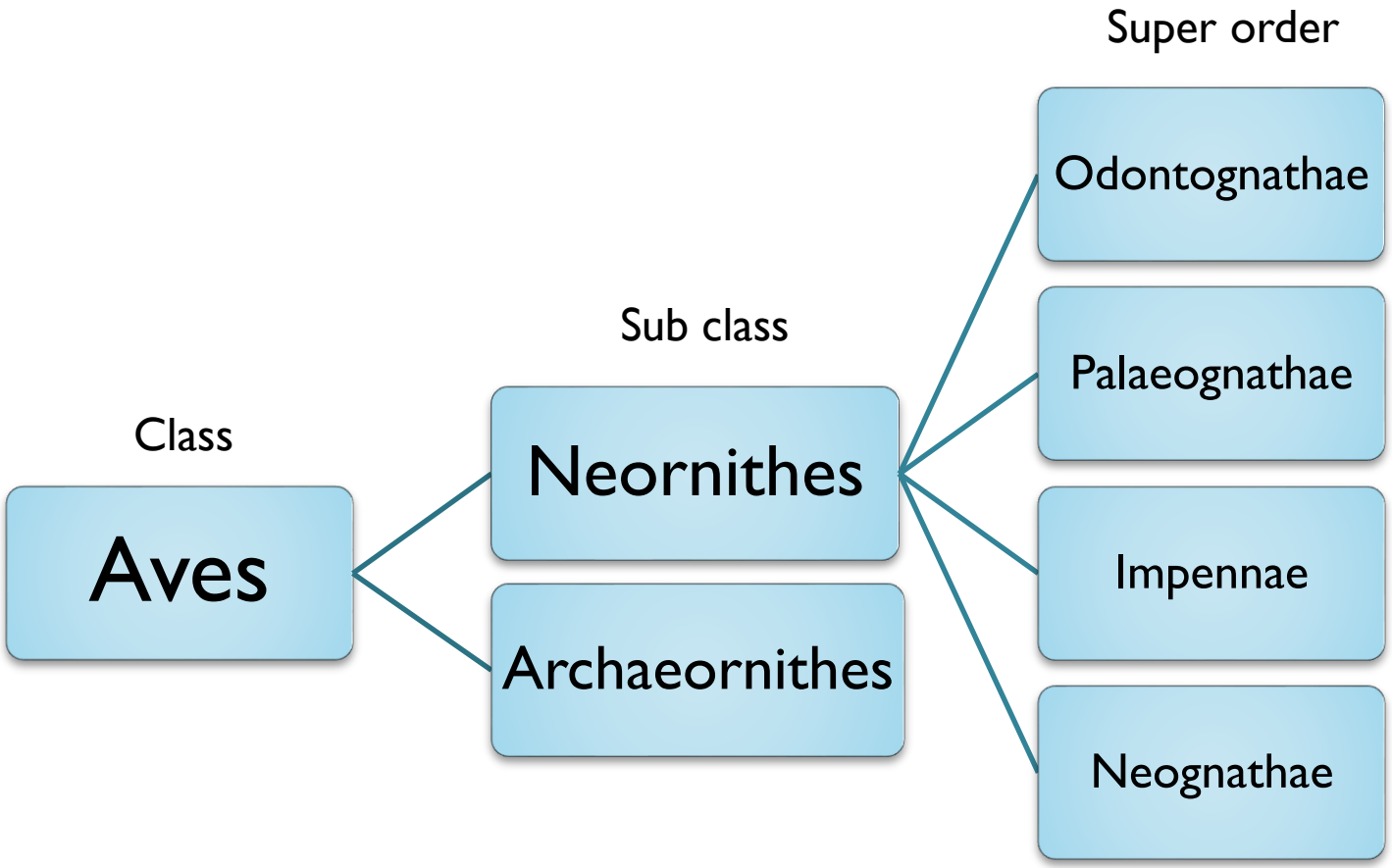
8.**Bony skeleton is light (some bones are hollow) .**

9.Has fatty gland at the base of tail.

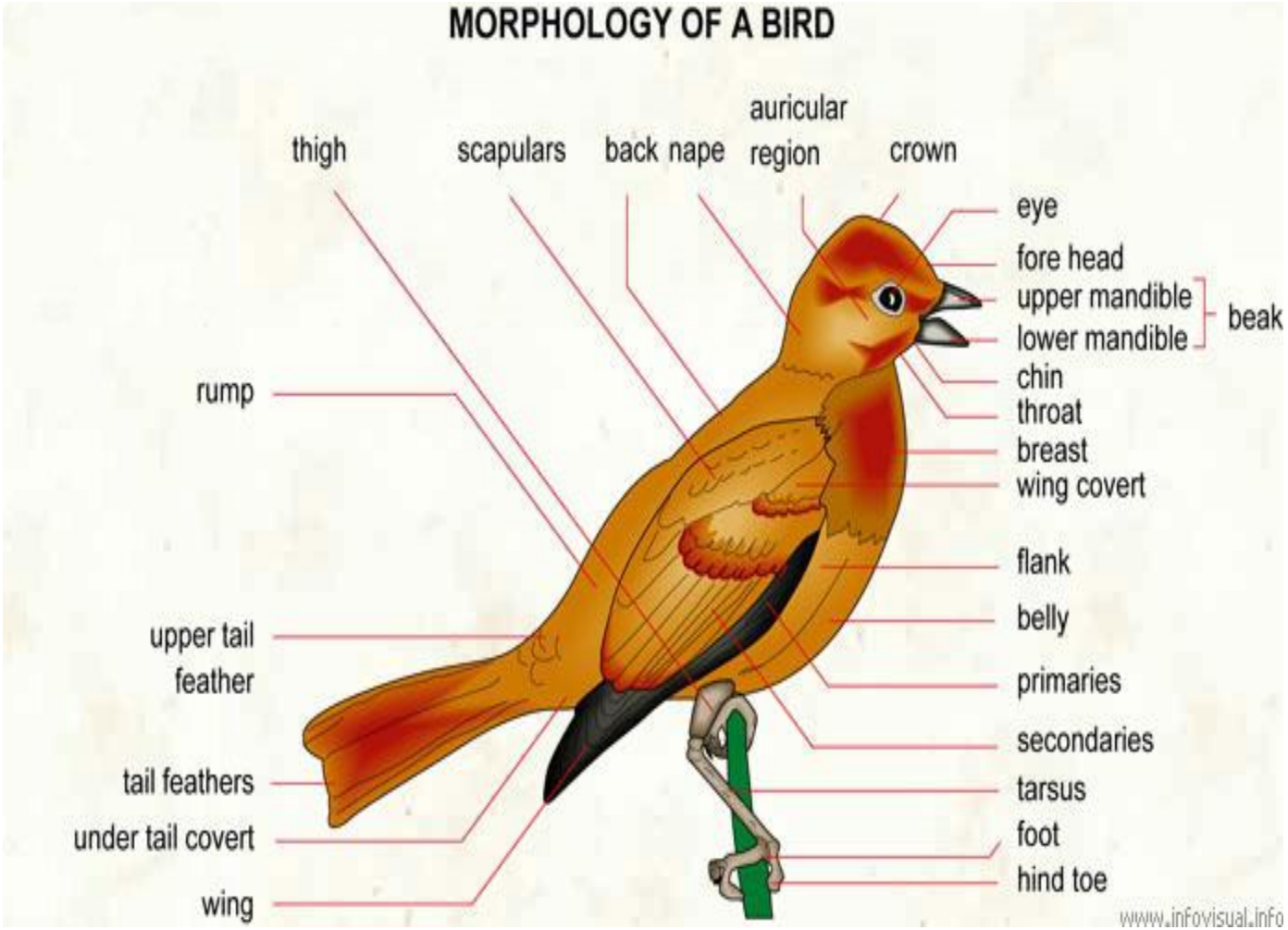
10.They do not have sweat gland.

11. **Oviparous animals** the laying of hard-shelled eggs, a high metabolic rate,

12.Sexes separate; testes paired, with the vas deferens opening into the cloaca.



https://www.researchgate.net/publication/318745290_Classification_of_birds_up_to_order

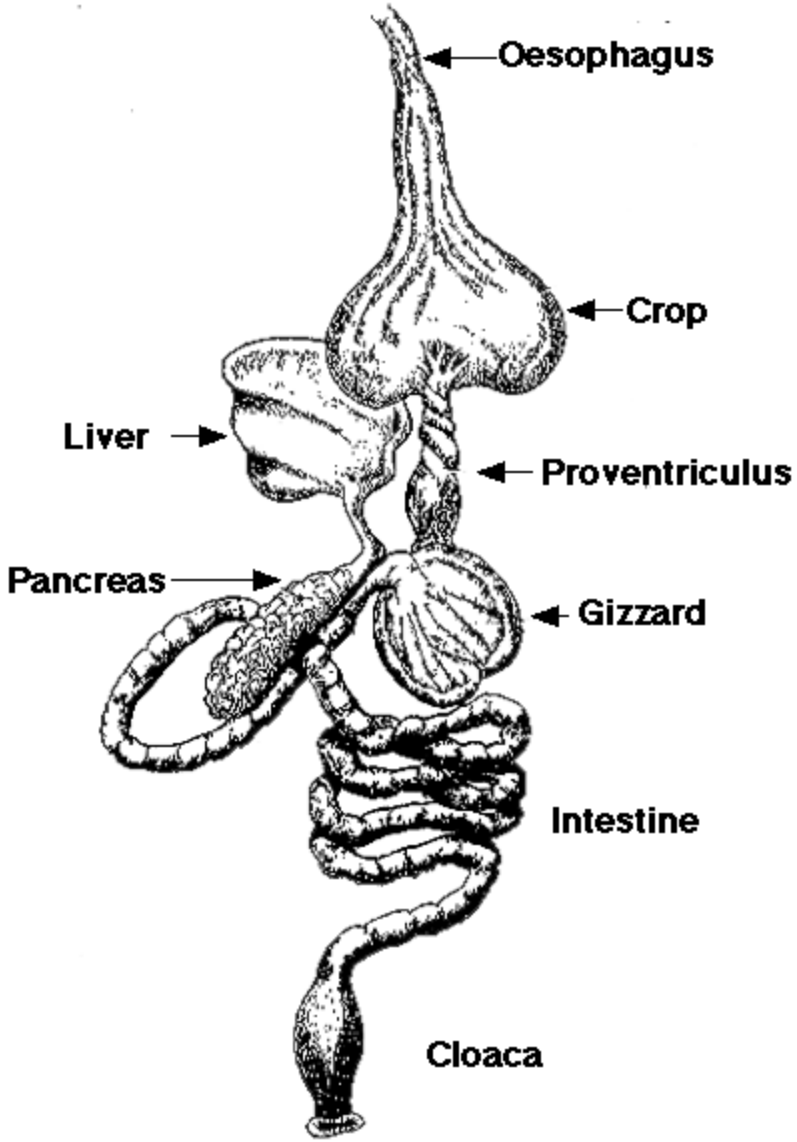

MORPHOLOGY OF A BIRD
thigh
scapulars
back
nape
auricular region
crown
eye
fore head
upper mandible
lower mandible
beak
chin
throat
breast
wing covert
rump
flank
belly
upper tail feather
primaries
secondaries
tail feathers
tarsus
under tail covert
foot
wing
hind toe
www.infovisual.info

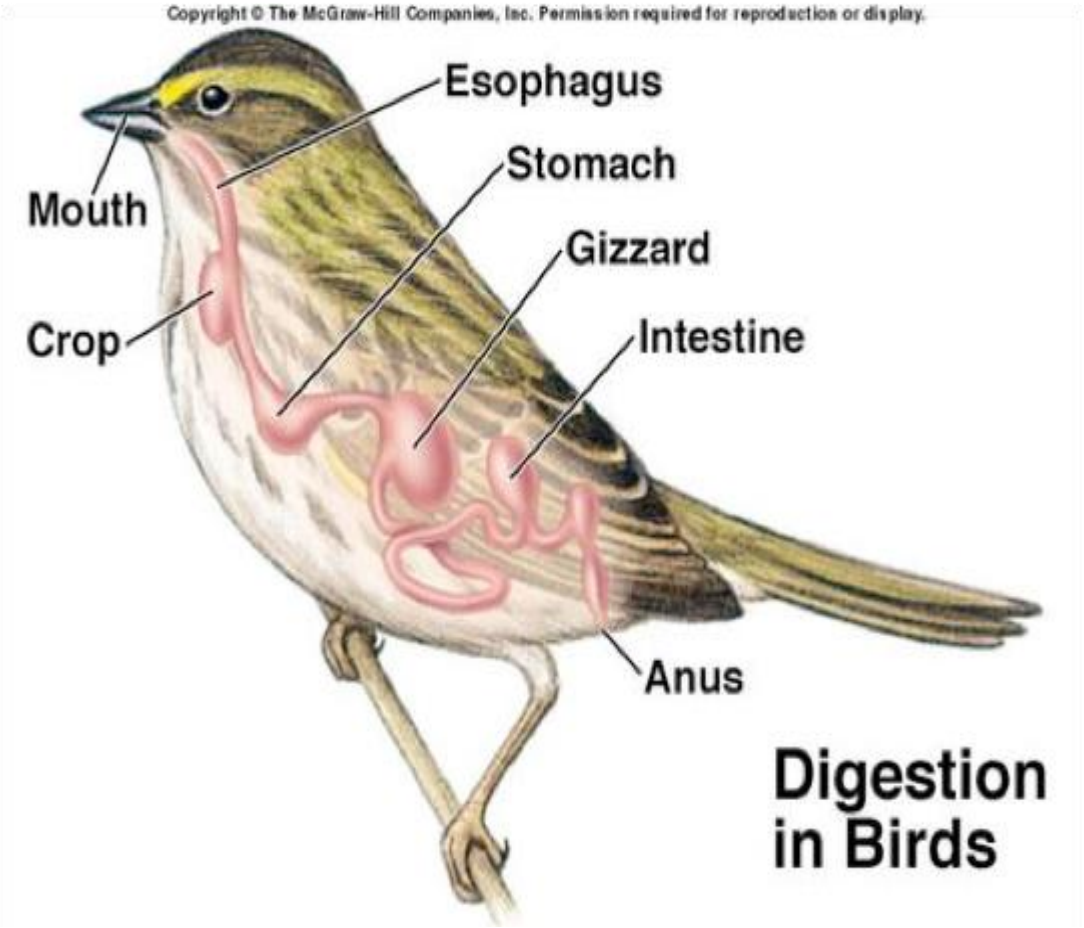
Digestive system of bird

From the bill, **food** moves down a tube called the esophagus and into the crop, which stores excess **food** so the bird can **digest** it slowly. ... The second part of the stomach, the gizzard, grinds the **food** into smaller pieces, often with the aid of grit such as sand or small stones the bird has swallowed earlier. the food digestion finishes in the intestine and then the nutrient moves to the blood stream

https://articles.extension.org/pages/65376/avian-digestive-system

Parts of birds digestive system

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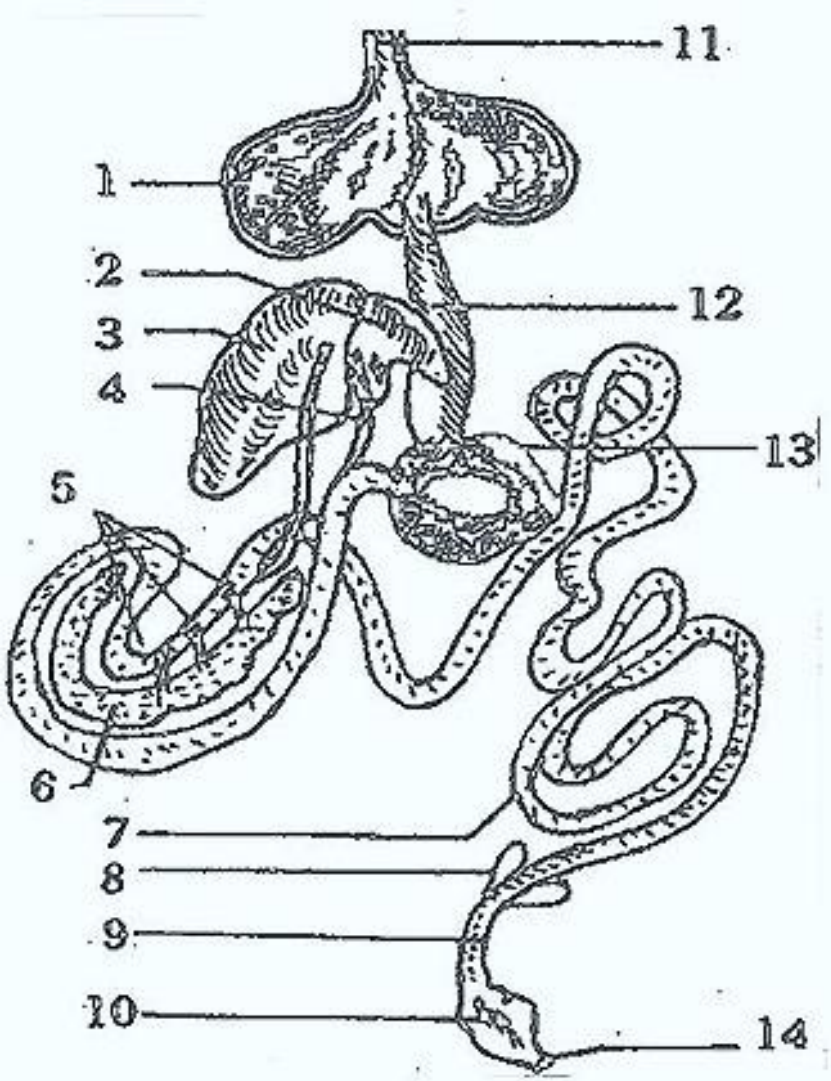
Esophagus
Stomach
Mouth
Gizzard
Crop
Intestine
Anus
Digestion in Birds

- Large intestine or colon (which relatively short compared to mammals which helps with quicker elimination to prepare for flight).

- Some birds have paired ceca that harbor bacteria , which aid in the breakup of cellulose but parrots do not have ceca.

- Cloaca .(the common chamber into which the intestinal and urogenital tracts discharge)

- Liver (has two lobes instead of the four found in human), pancreas and gallbladder also relates with digestive system.



1.Crop
2.Left Lobe Of Liver
3.Right Lobe Of Liver
4.Bile Duct
5.Pancreatic Ducts,
6.Pancreas
7.Ileum
8.Rectal Caecum
9.Rectum
10.Cloaca
11.Oesophagus
12.Proventriculus
13.Gizzard
14.Opening Of Cloaca.

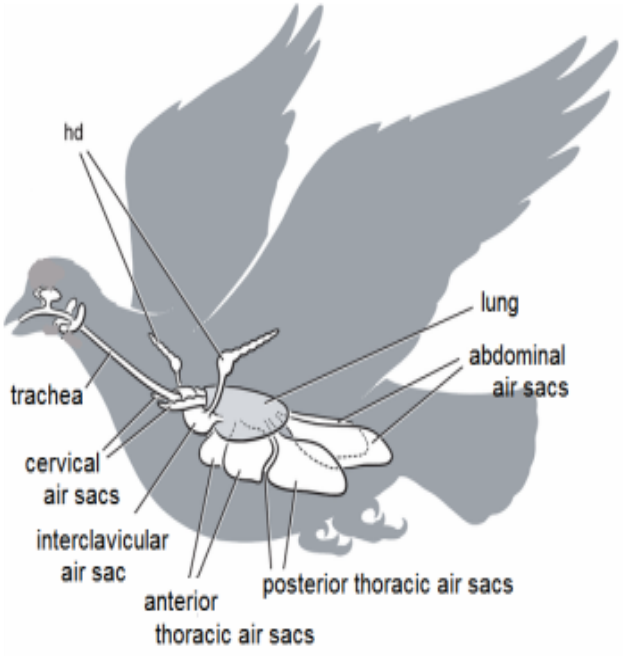
https://www.youtube.com/watch?v=jF0Id-hH9y4

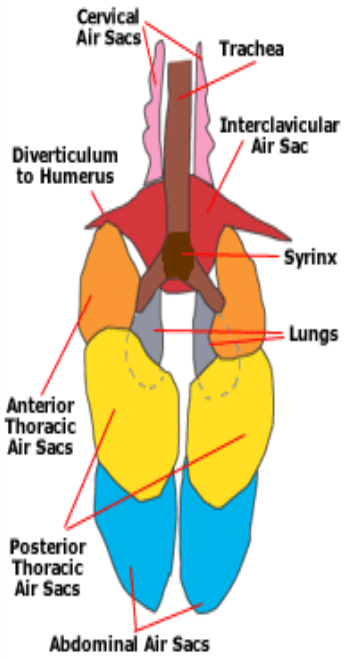
Unique characteristics of birds

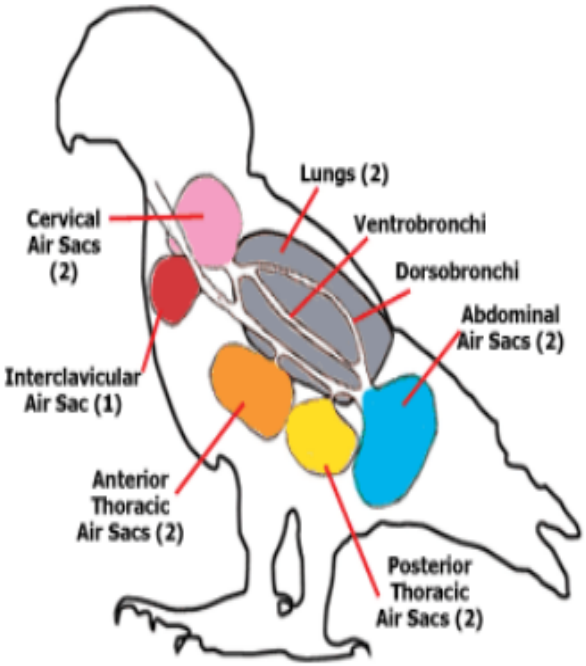
1-Presence of air sacs

It is biologically proven that from all other animals, it is only birds that do not possess a diaphragm. In place of the diaphragm, birds have air sacs. Air sacs are spaces within the bird where there is constant presence of air. Air is moved in and out of the bird's respiratory system through pressure changes in the air sacs. The air sacs also extend into some bone cavities and this makes the respiratory system of the birds more efficient. Air sacs also help to keep birds cool by expelling heat; this is quite useful because birds do not sweat

Air sac in birds

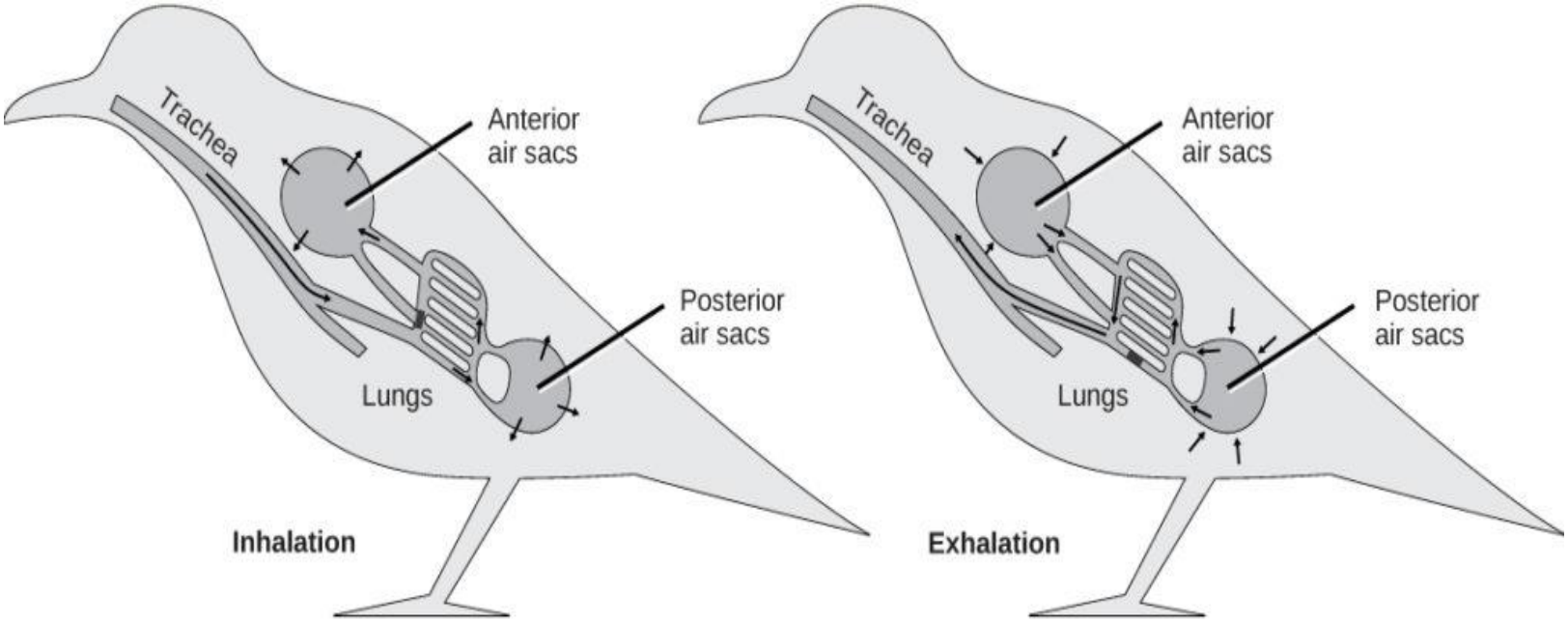






2-Pneumatic characteristic

All *chordatas* (animals that have a backbone), apart from birds, have bone marrow within their bones. Birds have bone cavities that are filled with air in place of the bone marrow. These cavities connect with the lungs of the respiratory system. This unique characteristic enables birds, unlike majority of the animals, to be airborne(able to fly) despite the gravitational effect.



3-Possession of feathers

Other groups of animals have their whole bodies covered fur or scales. Birds stand out to be different or unique from the rest of the animals in that; it is now proven that birds are the only living creatures that have feathers. Birds have two types of flight feathers found on the wings: thrust-producing feathers at the tip of the wing and lift providing secondary feathers. Not only flying, birds use their feathers for different purposes such as: regulating body temperatures, camouflaging, attracting mates, territorial dominance among others.

Flight feather

Down feather

4-Possession of wings

Animals have their forelimbs adapted differently depending on their environment. It is evident that most of the animals have their forelimbs adapted to walking. In spite of that, birds have their forelimbs adapted to flying. The modified forelimbs in birds are called wings. Birds use the wings primarily to fly though they also use them to regulate the body temperatures. Not all animals that have wings but all birds have wings.

5-Skeletal structure

Most animals have their skeletons adapted to movement on the surface for example; walking is dominant. However the case, birds have their skeletons modified for flight. Most birds have lightweight skeletons and their bones lack bone marrow (hollow bones). Unlike other animals, birds have the two clavicles fused forming the furcula or bone-wish which is both flexible and strong enough to support the shoulder girdle during flapping. The many fused bones in birds including the collar bone and the bone-wish make the skeleton flexible for flight. Birds also have their sternums larger relative to the other body parts. The large sternum provides sturdy attachment points of wing muscles. For this reason, birds tend to be different from other animals.

http://www.differencebetween.net/science/nature/difference-between-animals-and-birds/

Skeleton system of birds

Thank you for your attention ☺

- ANY QUESTIONS ?????