COMPILED AND CIRCULATED BY DR. POULAMI ADHIKARY MUKHERJEE, ASSISTANT PROFESSOR, DEPARTMENT OF ZOOLOGY, NARAJOLE RAJ COLLEGE

Human Respiratory System

BY

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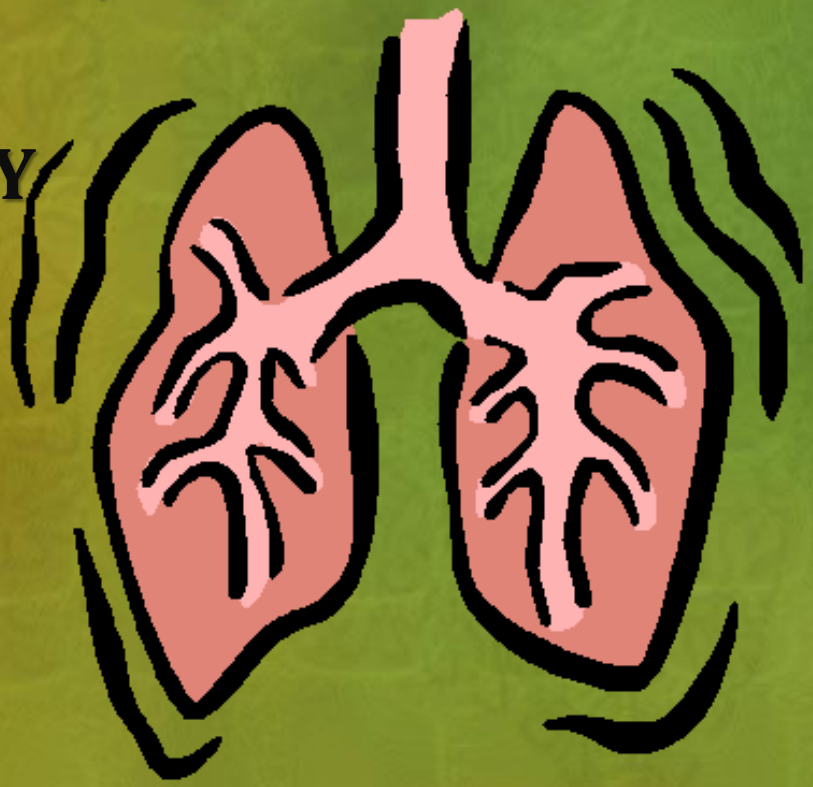

Physical Respiration

- The process of exchanging O_2 and CO_2 between an organism and its external environment.
- Occurs through a moist cell membrane.
- Also called breathing

Gas Exchange

- The human respiratory system is a network of passages that allows for gases to flow into and out of the body.

- O_2 flows in & is needed for cellular respiration.

- CO_2 flows out & is a waste product from cellular respiration.

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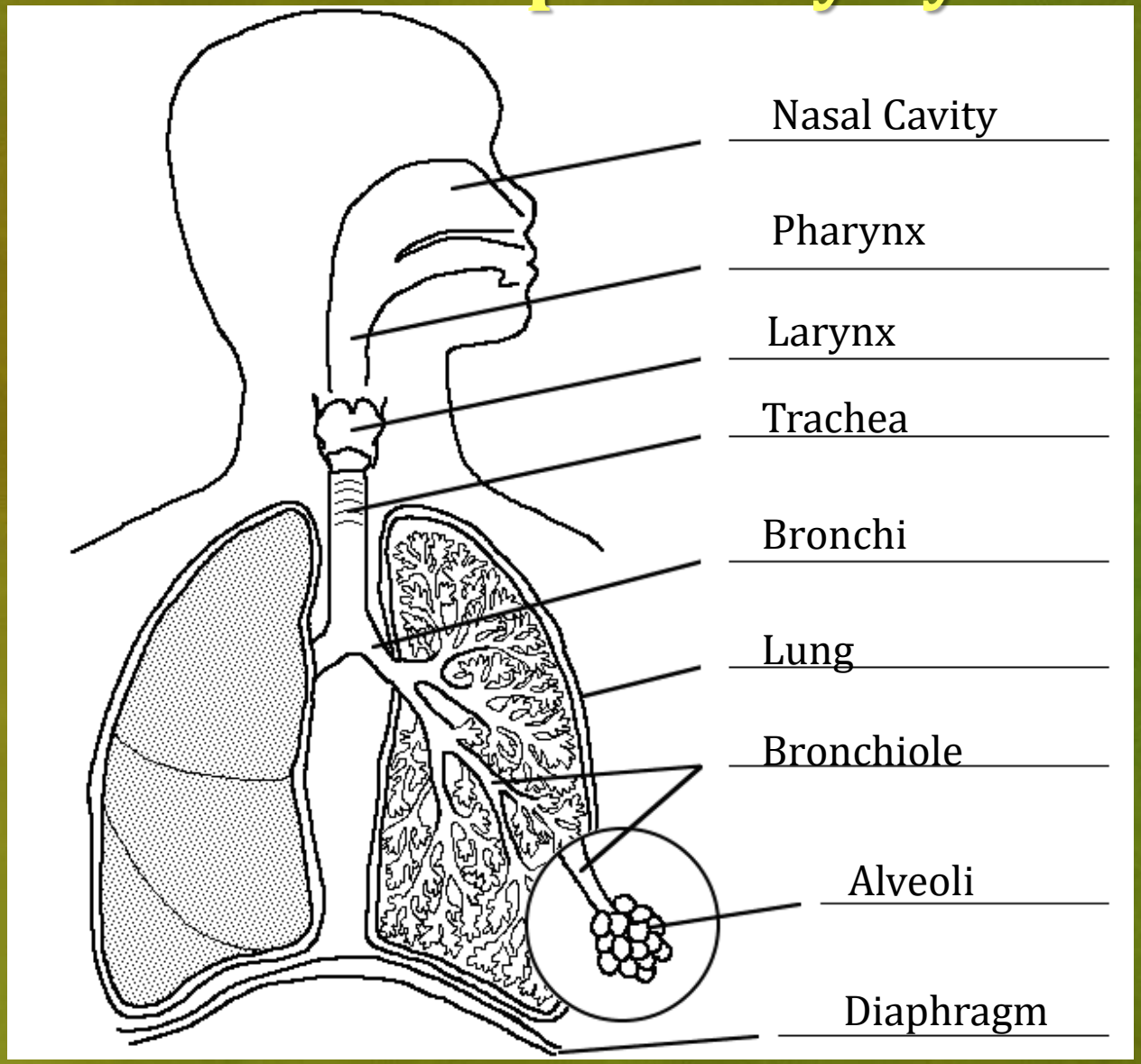
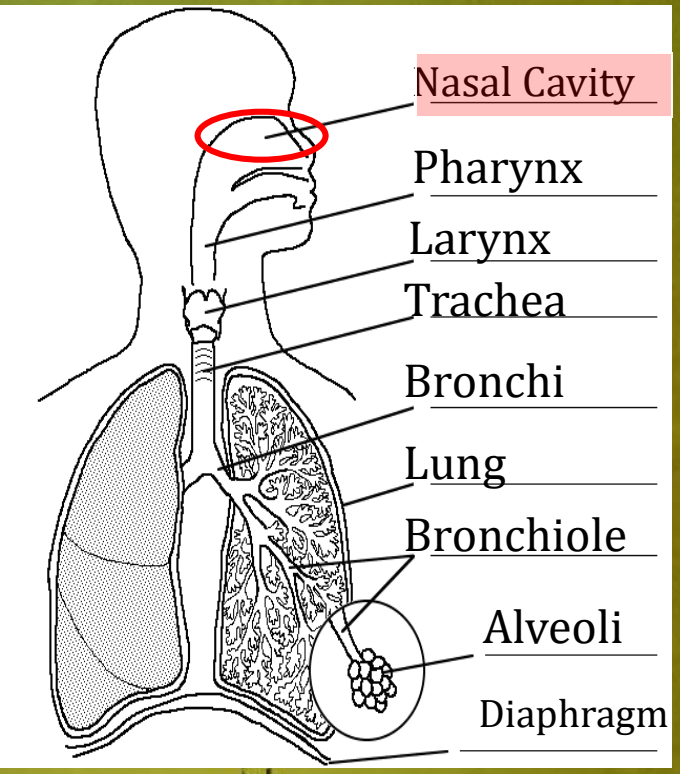
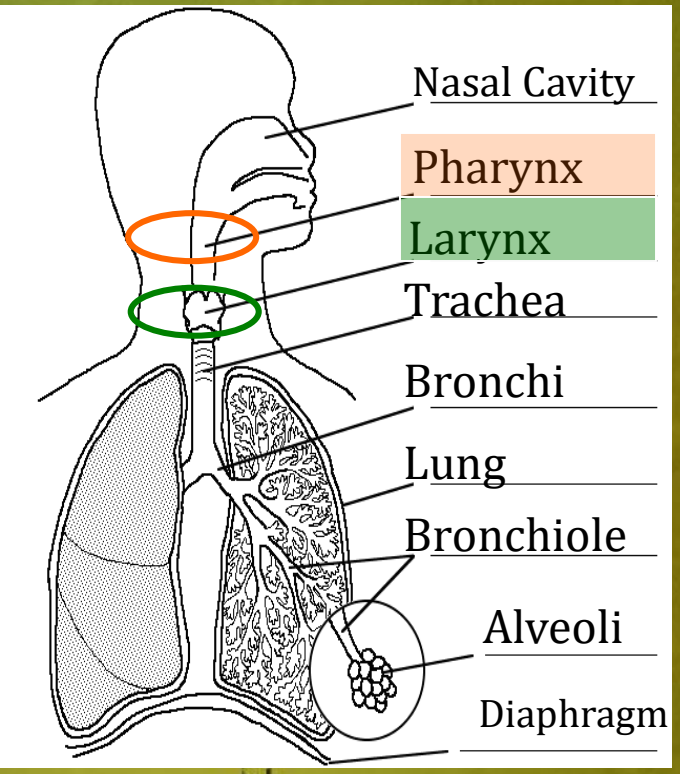
Structures of the Respiratory System





Nasal Cavity

- Air enters/exits through nostrils
- Lined with ciliated mucous membranes which filters, warms and moistens air.

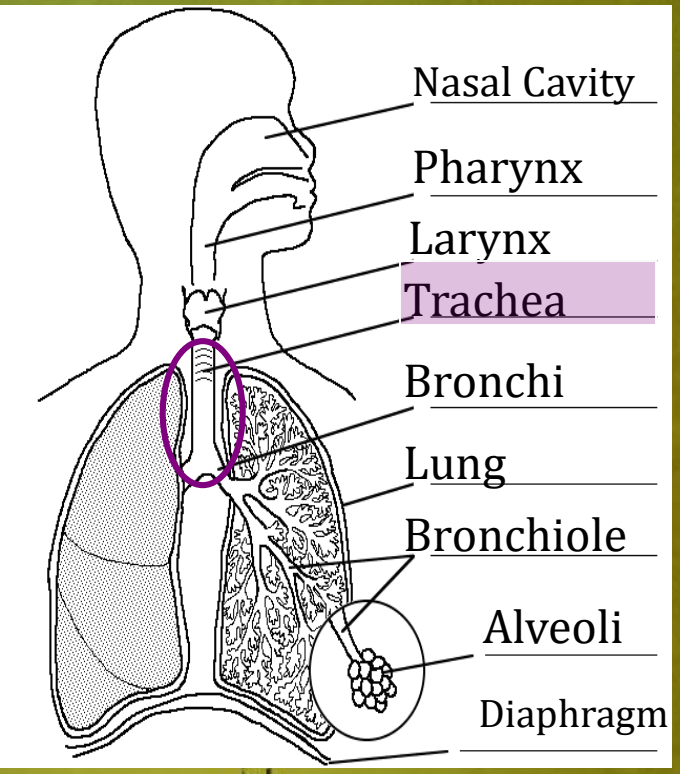


Pharynx (throat)

- The upper part of the throat, where the nasal cavity meets the oral cavity.

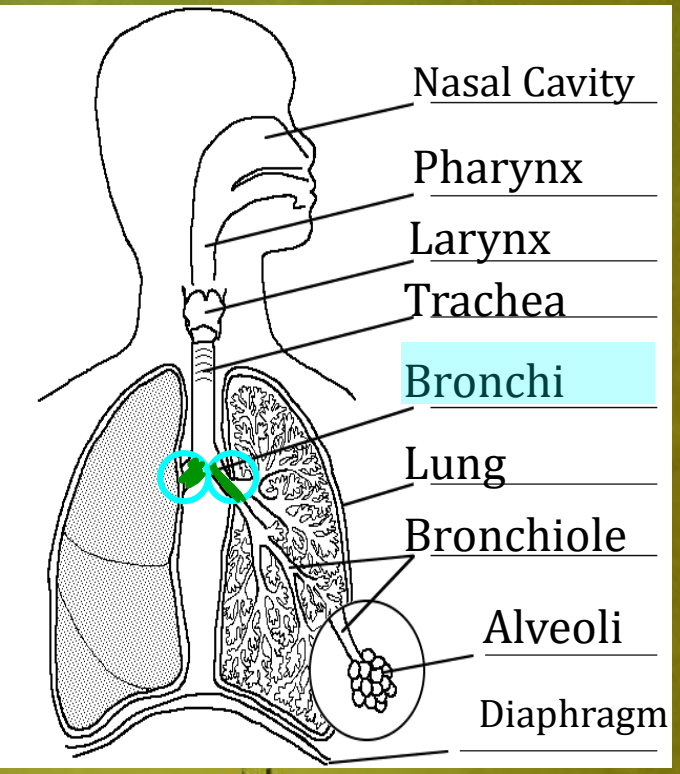
Larynx (voice box)

- Contains vocal cords (flaps that vibrate to produce sounds when air passes over them)



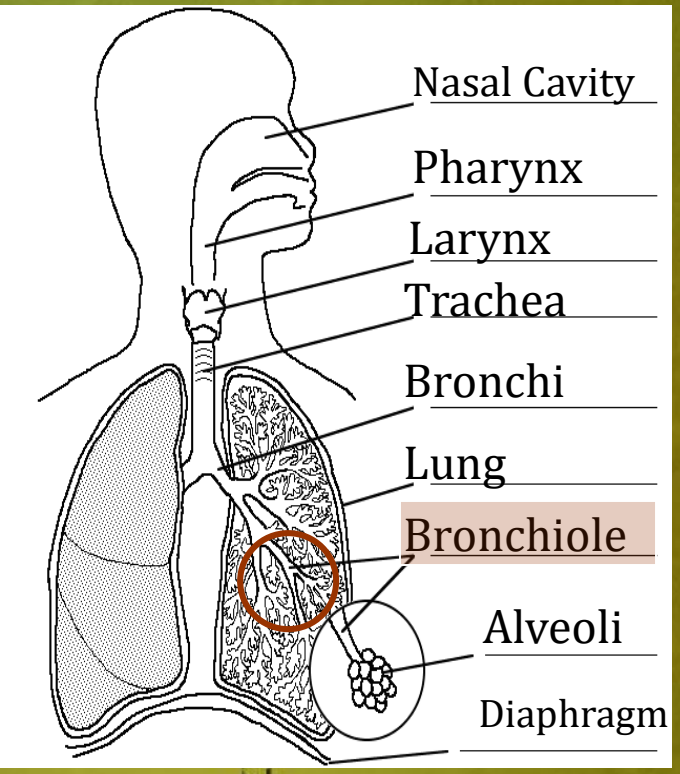
Trachea (Windpipe)

- kept open by rings of cartilage
- lined with ciliated mucous membranes which filters, warms and moistens air.
- deposits from cigarette smoke and other pollutants interfere with action of the cilia.
- Food is prevented from entering the trachea by the epiglottis.



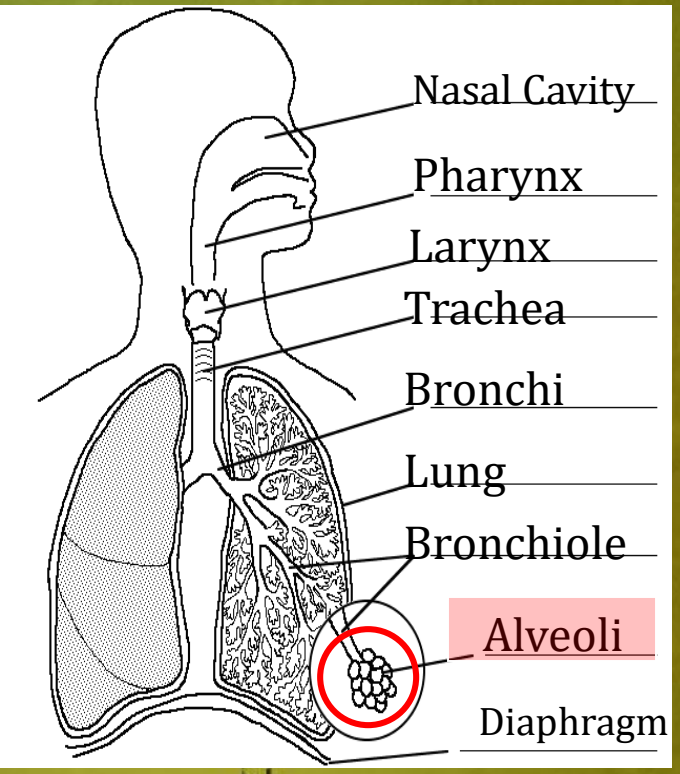
Bronchi (singular: bronchus)

- Branch off from the trachea.
- One bronchus goes to each lung.
- Ringed with cartilage.
- Lined with ciliated mucous membranes which filter, warm and moisten air.



Bronchioles

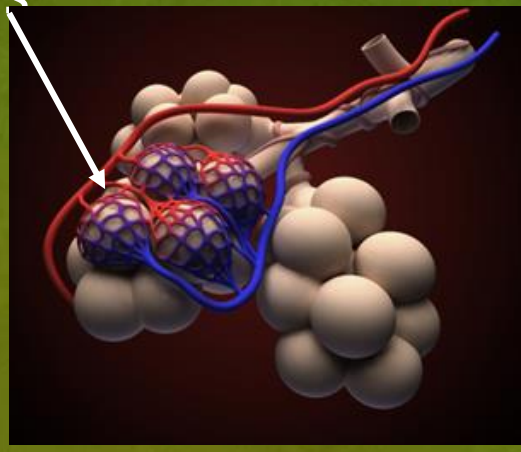
- Branch off from bronchi.
- Airways are within the lungs.
- They are NOT ringed with cartilage.
- Lined with ciliated mucous membranes to filter, warm and moisten air.



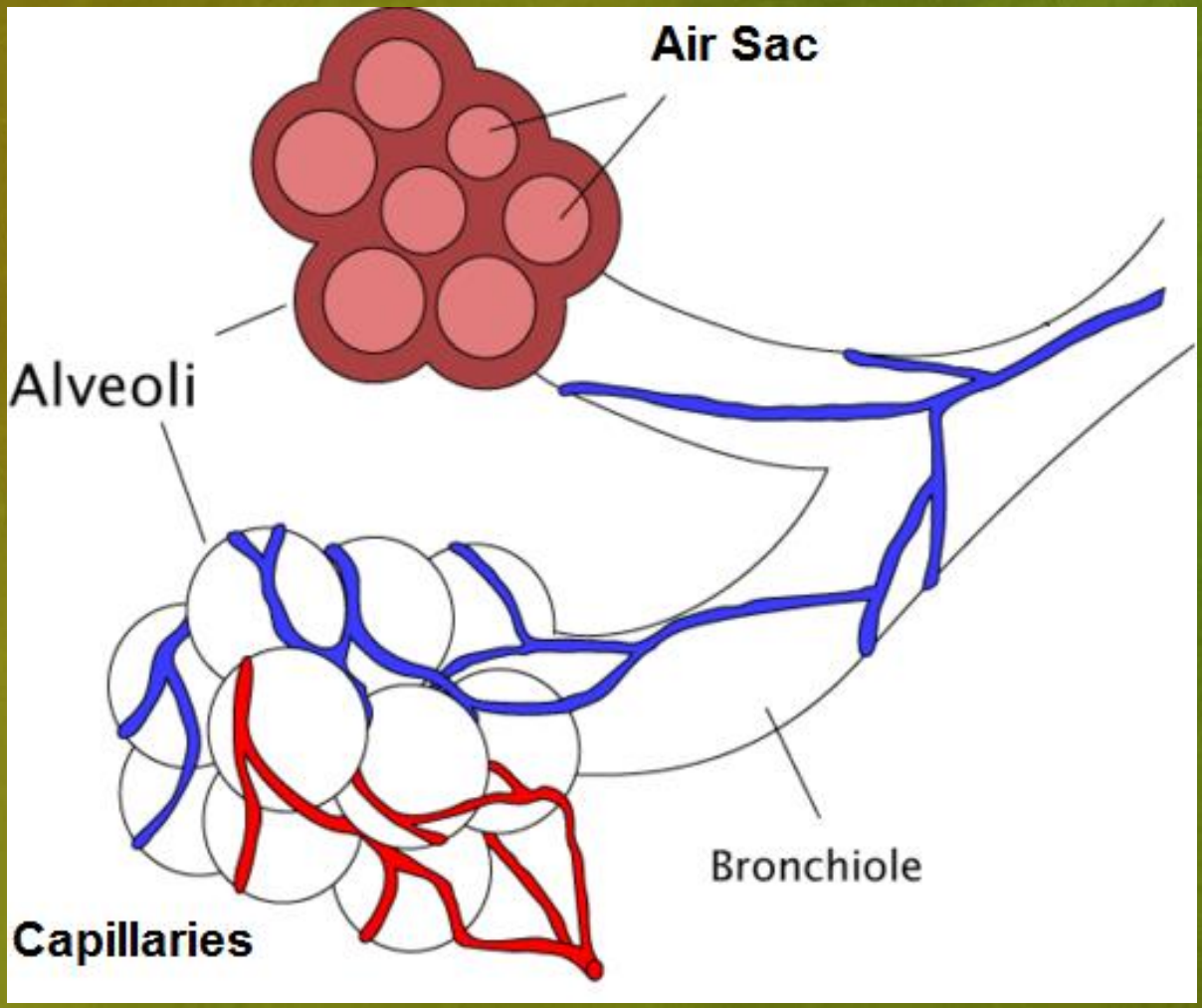
Alveoli

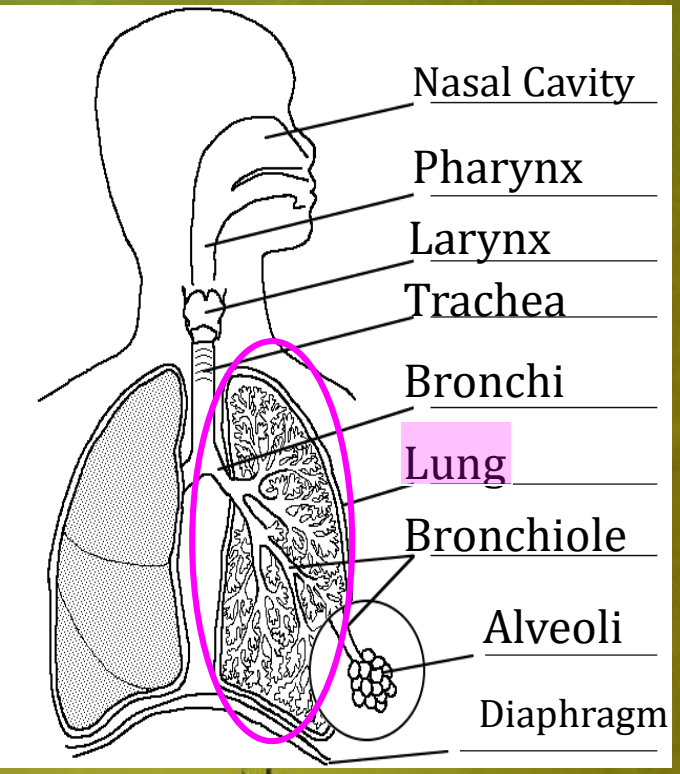
The Functional Unit of the Lungs

- Elastic air sacs found at the end of bronchioles.
- Thin and moist. Alveoli are 1 cell thick.
- Surrounded by capillaries
- O_2 diffuses into the blood and CO_2 diffuses out of the blood.



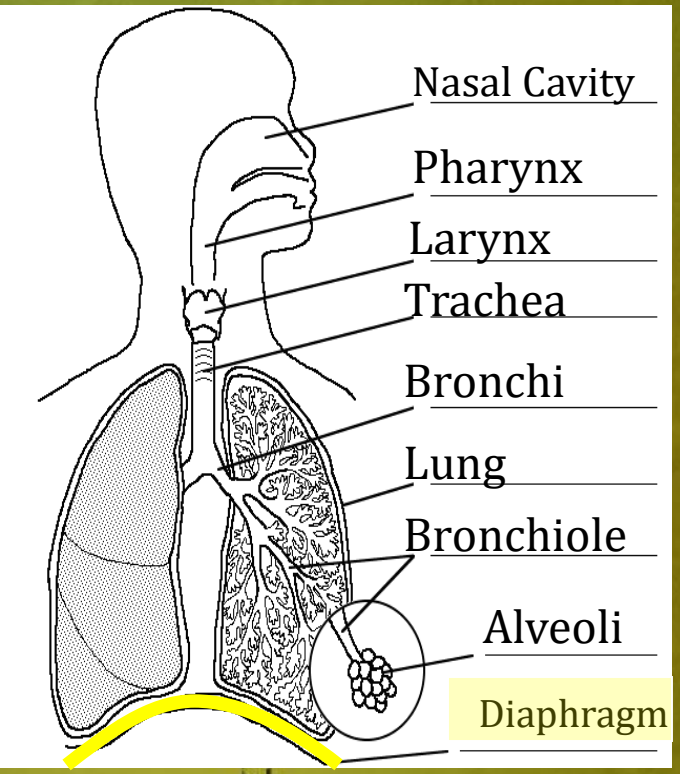
Alveoli Structure





Lungs

- Main organs of the respiratory system.
- Elastic structures that allow for air to enter and exit.
- Include the (bronchi), bronchioles and alveoli.

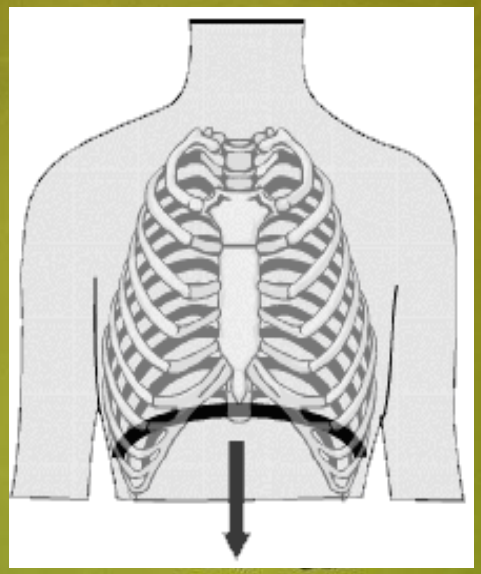


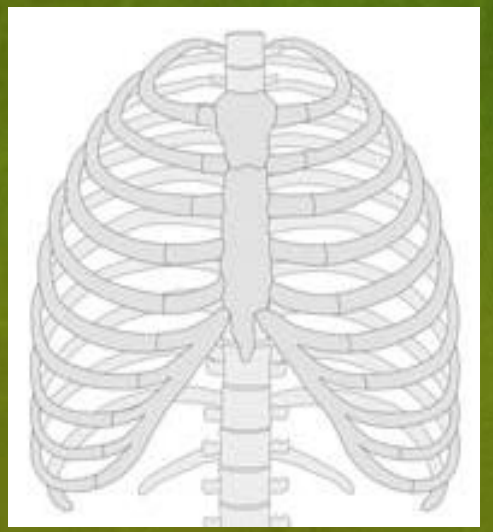
Diaphragm

- A muscle underneath the lungs.
- It contracts (flattens) when you inhale.
- It relaxes (pushes up) when you exhale.

Inhaling

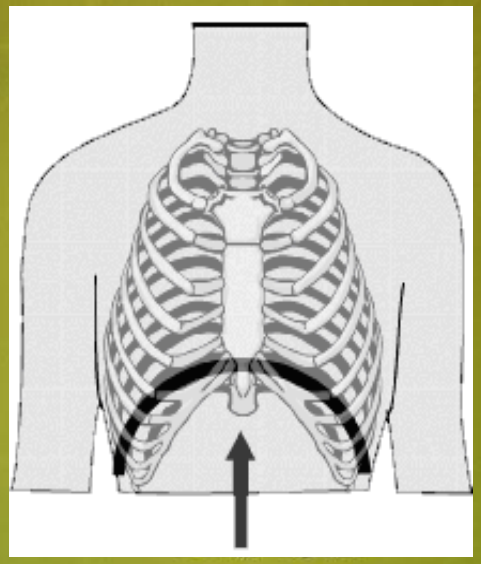
- The diaphragm contracts and moves downward.
- The ribs move up and out.
- The change in pressure in the chest cavity pulls air into the lungs.

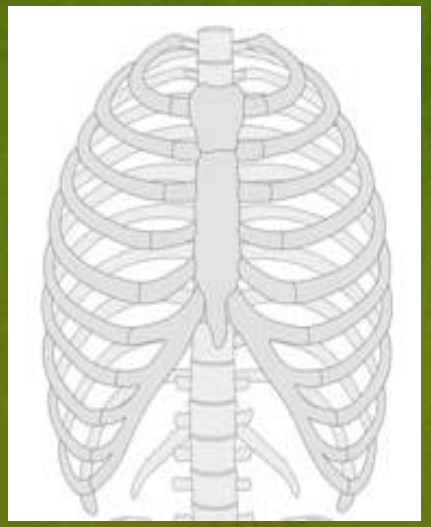




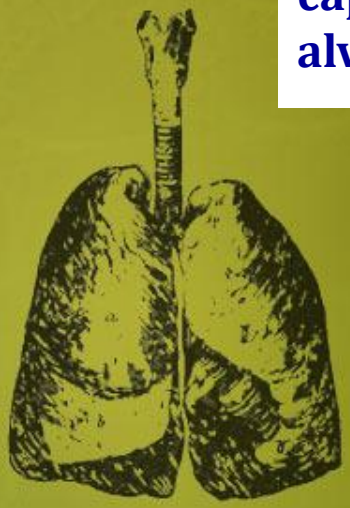
Exhaling

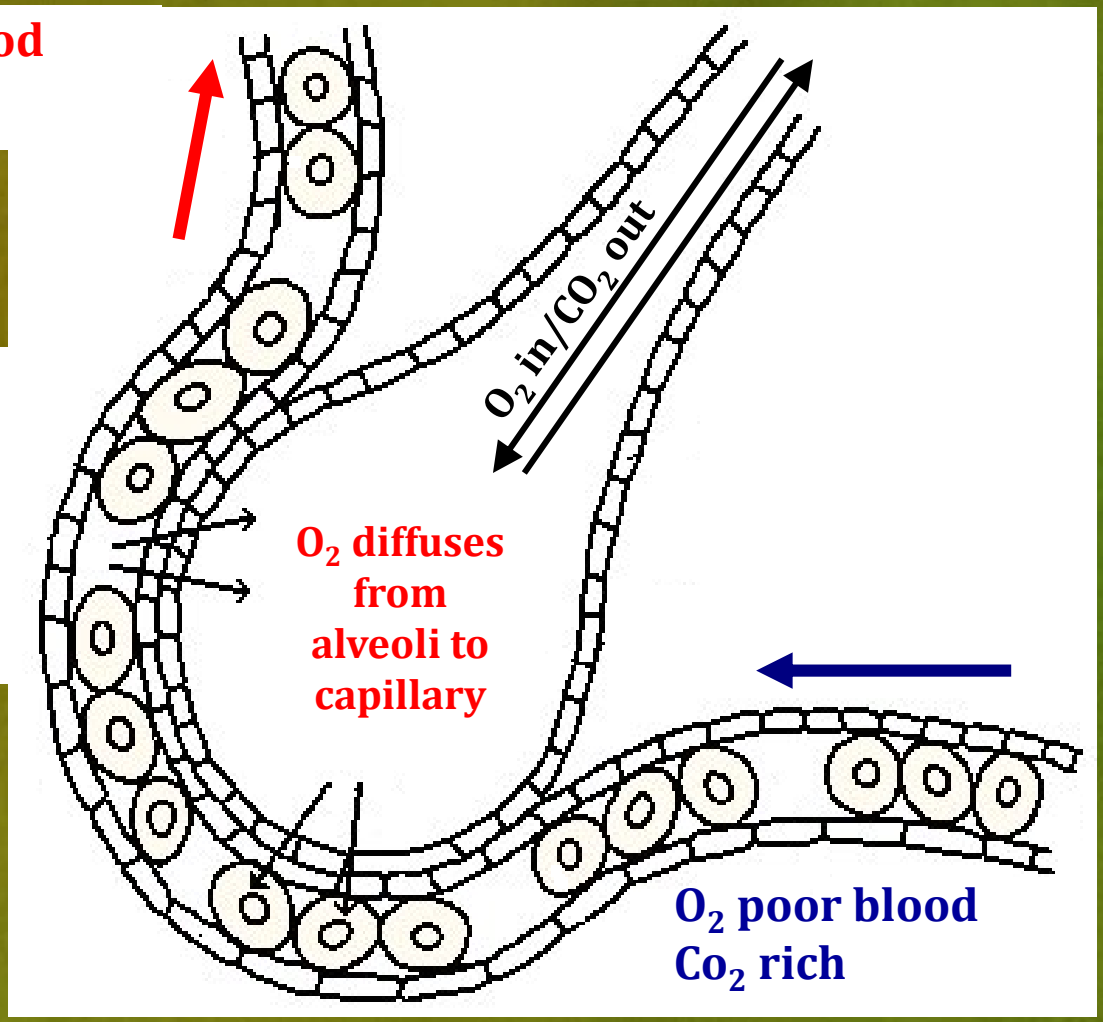
- The diaphragm relaxes and moves upward.
- The ribs move down and in.
- Air is pushed out of the lungs.



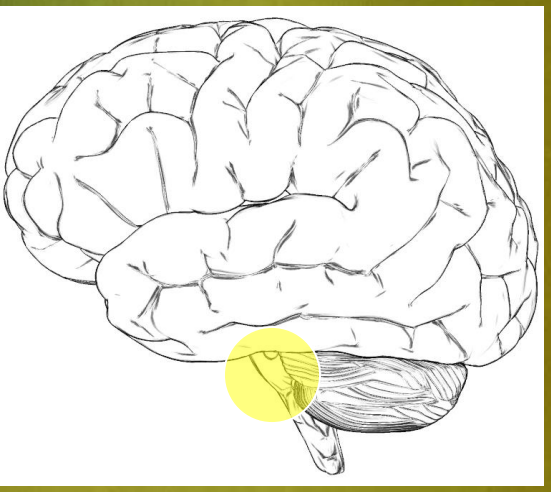


Gas Exchange in the Alveoli





How is Breathing Controlled?



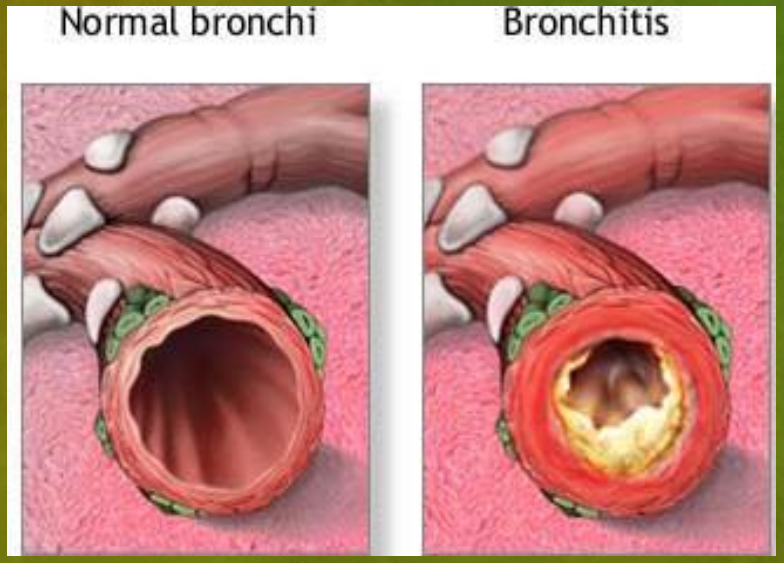
- Breathing rate is controlled by the medulla (a part of your brain that is responsible for involuntary actions).
- The Medulla monitors the concentration of CO_2 in the blood.
  - High CO_2 – breathe faster to get rid of CO_2

Disorders of the Respiratory System

Bronchitis

- Membranes lining the bronchi become inflamed ("-itis" means inflammation).

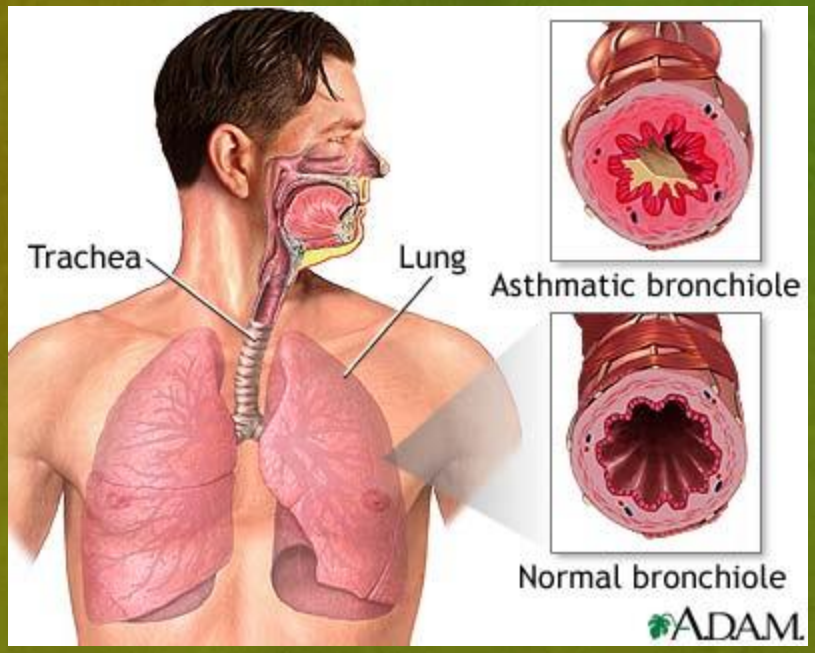
- Symptoms – coughing, wheezing, shortness of breath.



Disorders of the Respiratory System

Asthma

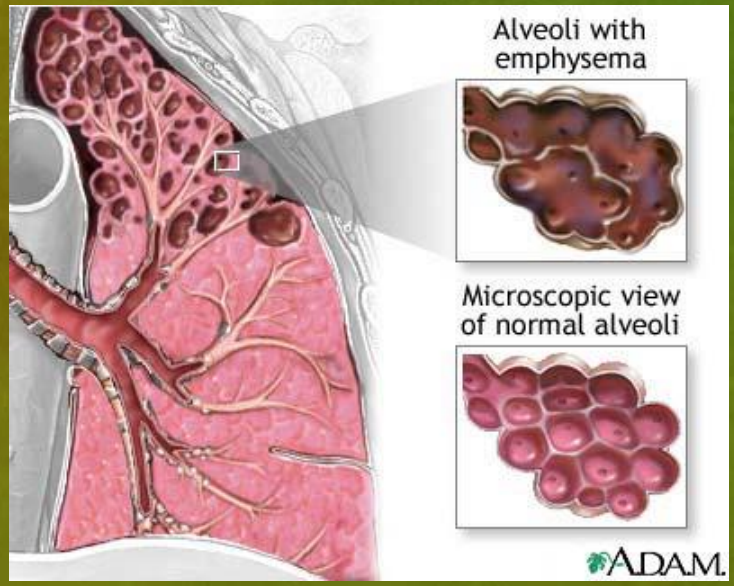
- An allergic reaction where inflammation of bronchial airways & increased mucous production prevents air from entering or exiting the lungs.



Disorders of the Respiratory System

Emphysema

- Alveoli lose elasticity (usually due to smoking).
- Gas exchange is not efficient.
- Symptoms – fatigue (tired) & shortness of breath.



Disorders of the Respiratory System

Lung Cancer

- Uncontrolled cell growth in the lungs.
- Usually caused by smoking.
- Cancer interferes with gas exchange.

Lung with Lung Cancer

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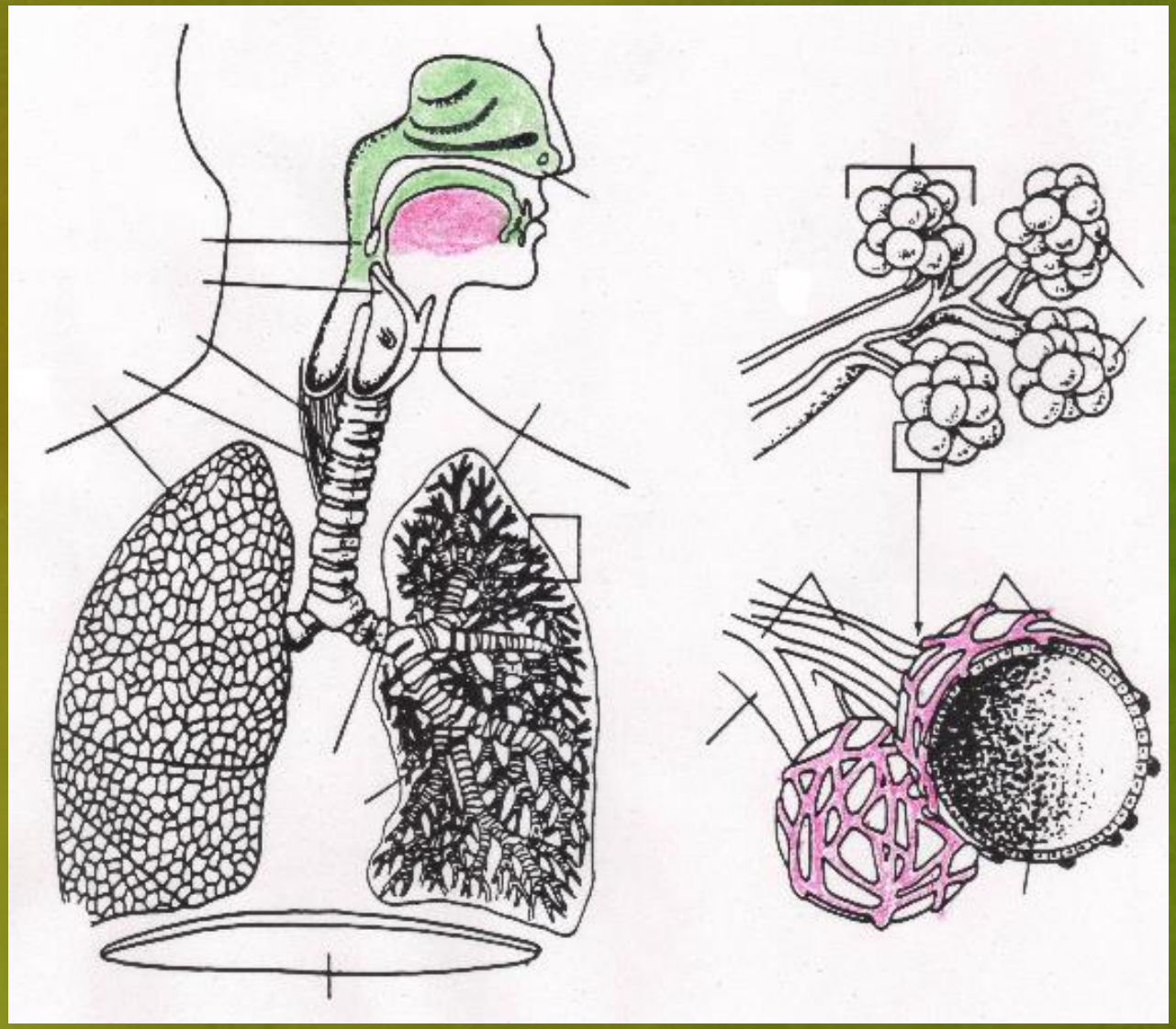

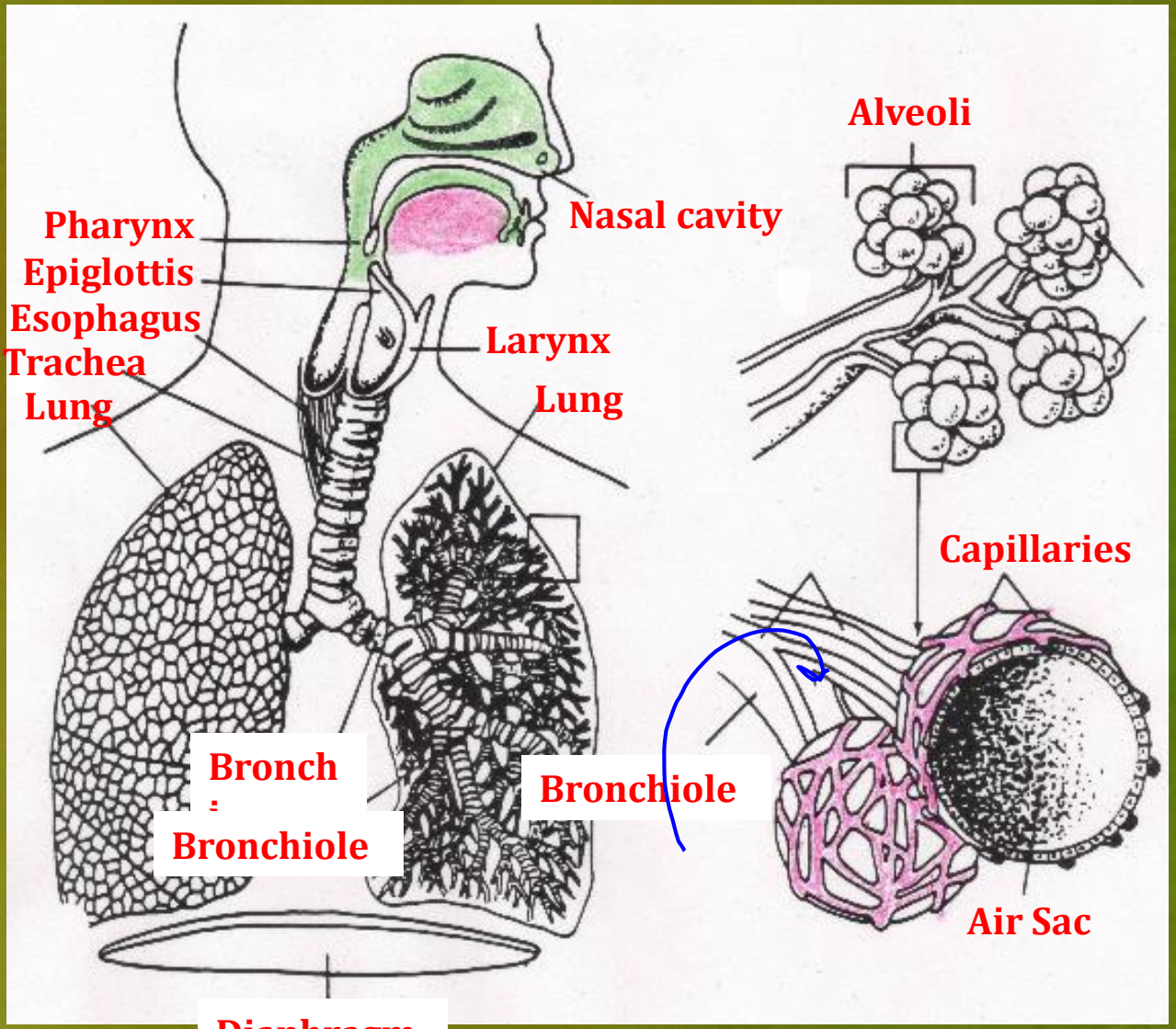
Pharynx
Epiglottis
Esophagus
Trachea
Lung
Nasal cavity
Larynx
Lung
Bronch
Bronchiole
Diaphragm
Alveoli
Capillaries
Bronchiole
Air Sac

THANK YOU