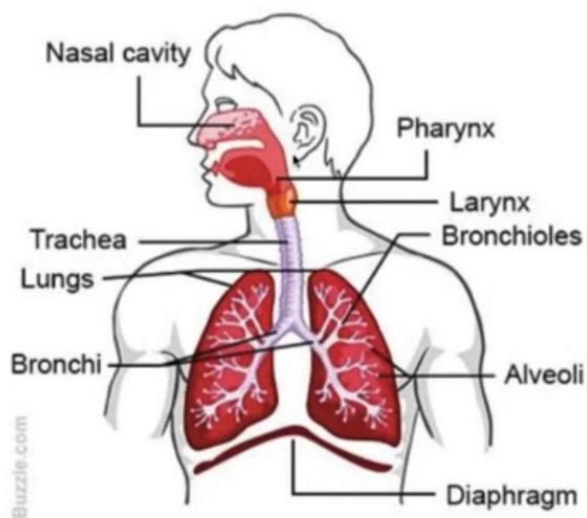


## Functions of Respiratory System

1. Gas exchange between blood and air.
2. Move air to and from exchange surfaces.
3. Protect exchange surfaces from environmental variations and pathogens.
4. Produce sound.
5. Detect olfactory stimuli.

### Components of the Respiratory System

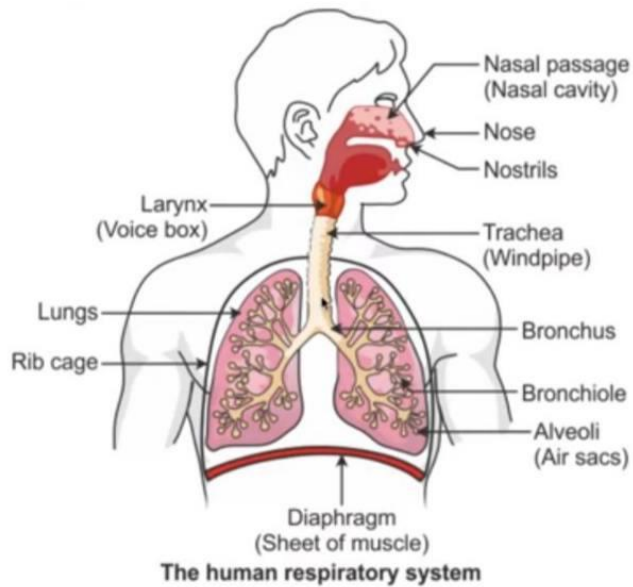
1. Nose, nasal cavity, and paranasal sinuses.
2. Pharynx
3. Larynx
4. Trachea, bronchi
5. Lungs
6. Bronchioles
7. Alveoli (gas exchange)



## The Respiratory Tract divided to

\*Conducting portion: Conduct the air movement from nose to small bronchioles

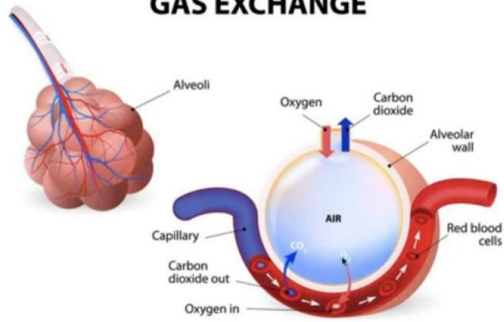
\*Respiratory portion: Gas exchange region respiratory bronchioles and alveoli



## The Respiration Include Three Integrated Processes:

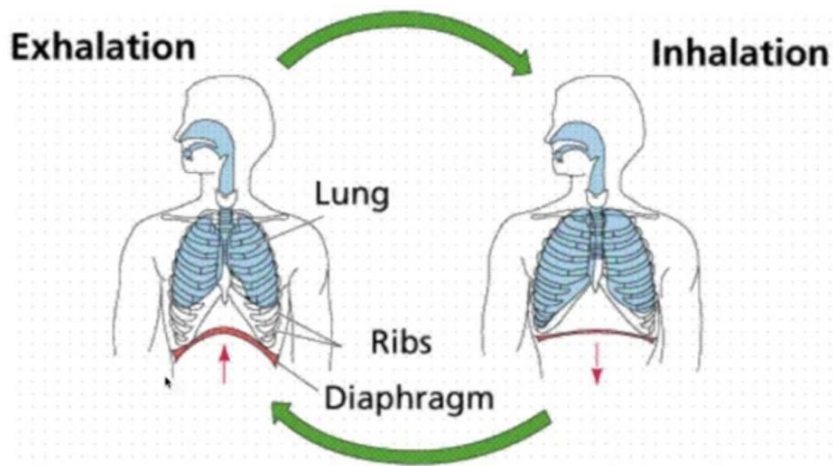
1. Pulmonary ventilation-Moving air into and out of the respiratory tract; breathing .
2. GAS exchange -Diffusion between alveoli and circulating blood, and between blood and interstitial fluids.
3. Gas transport-Movement of oxygen from alveoli to cells, and carbon dioxide from cells to alveoli

## ALVEOLUS GAS EXCHANGE

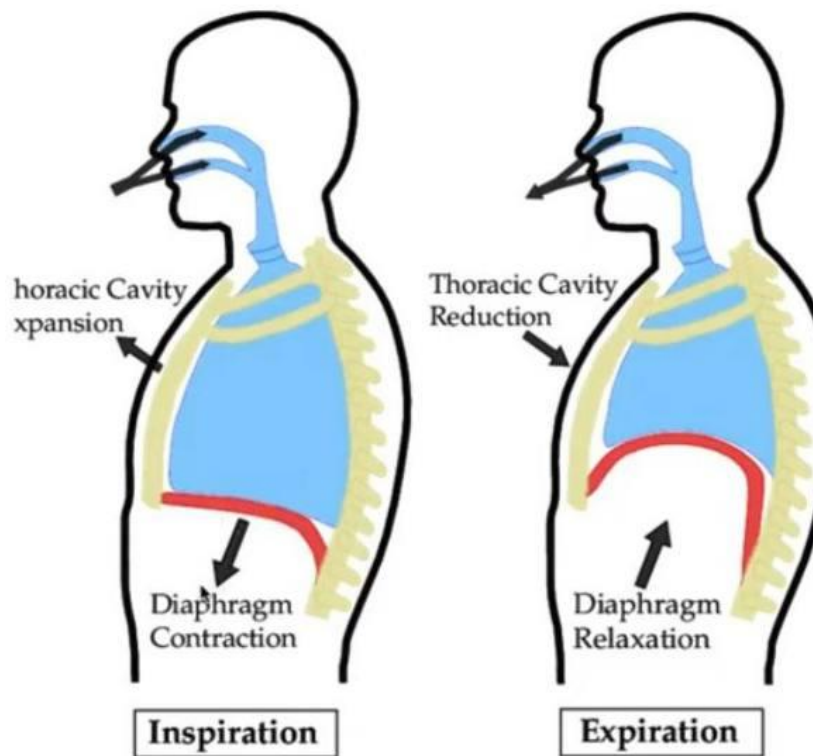
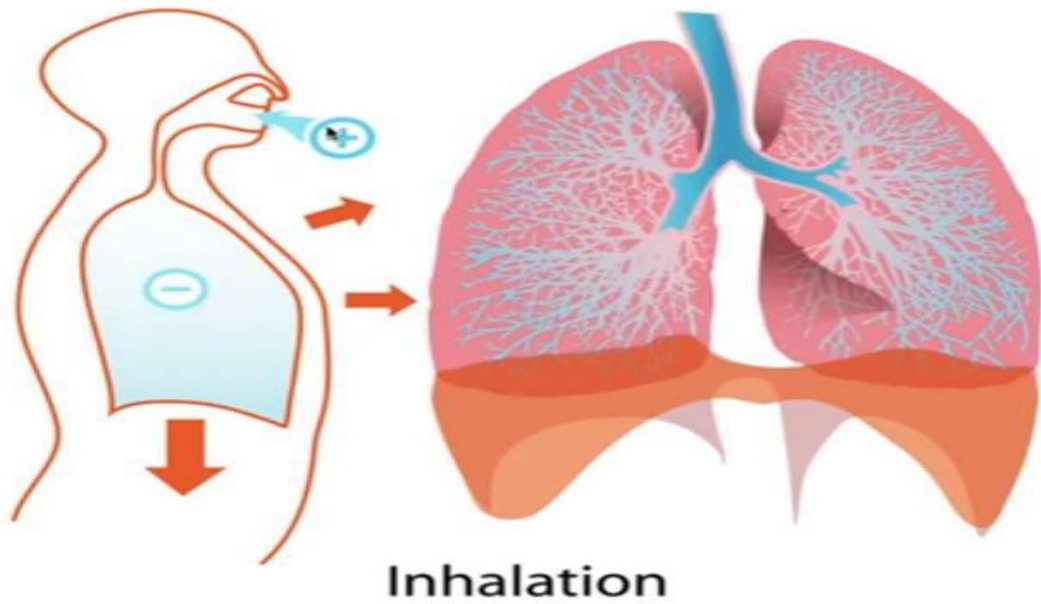


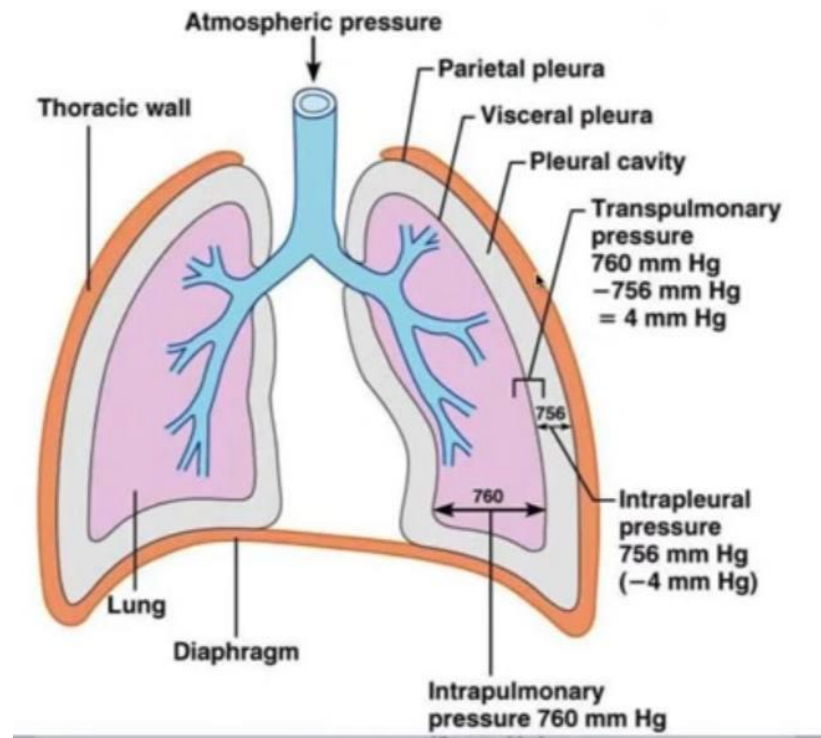
## Pulmonary Ventilation

1. Respiratory cycle-A single breath consisting of inspiration (inhalation) and expiration (exhalation).
2. Respiratory rate-Number of cycles per minute
  - Adult normal rate 12 to 18 breaths/minute
  - Child normal rate 18 to 20 breaths/minute
3. Alveolar ventilation-Movement of air into and out of the alveoli



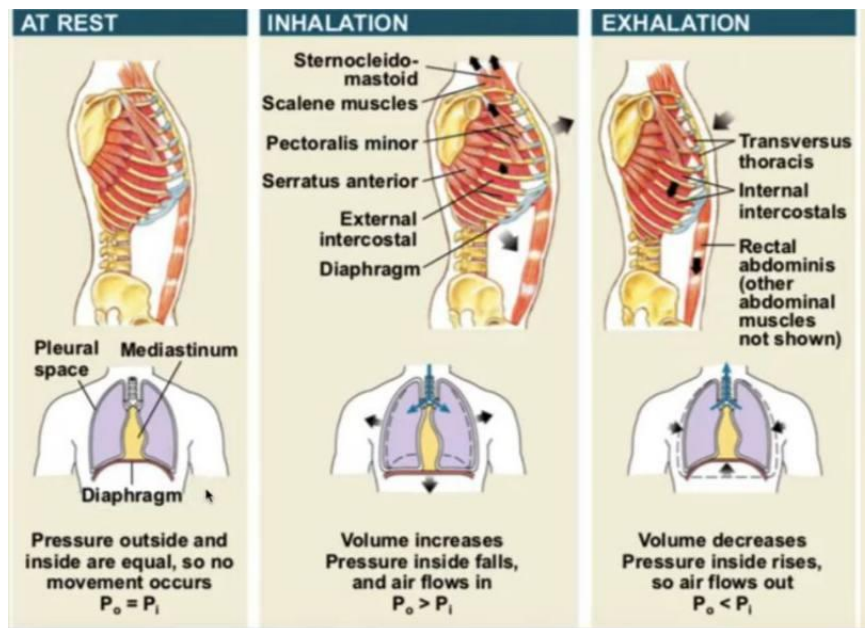
\*The direction of air flow is determined by the relationship of atmospheric pressure and pressure inside the respiratory tract. Flow is always from higher to lower pressure.





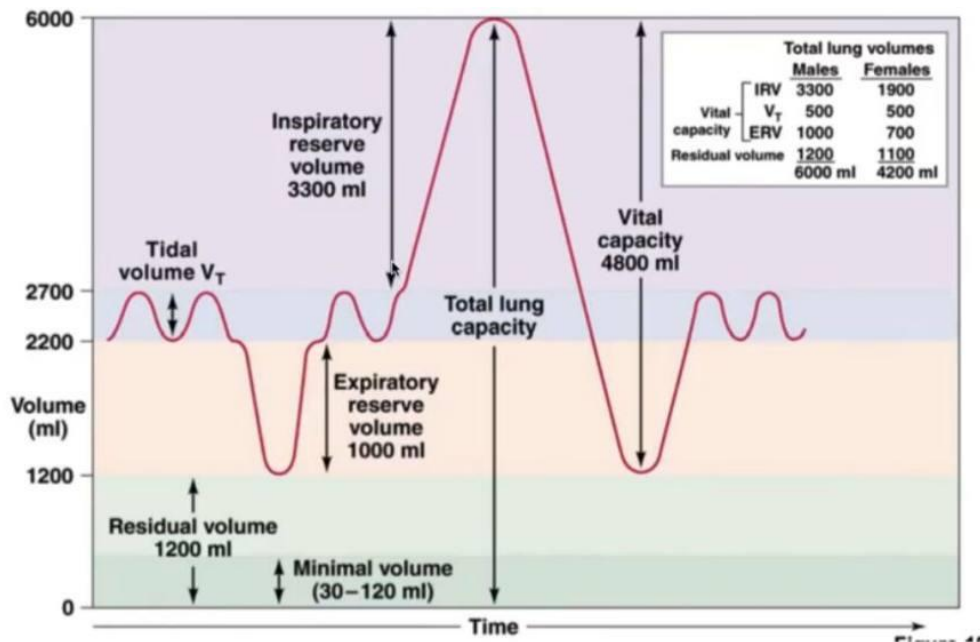
\*Quiet breathing-Diaphragm and external intercostals are involved. Expiration is passive.

\* Forced breathing-Accessory muscles become active during the entire breathing cycle. Expiration is active.



## Lung Capacities and Volumes

1. Vital capacity-Tidal volume + expiratory reserve volume + inspiratory volume.
2.  $VC = TV + ERV + IRV$ .
3. Residual volume-Volume of air remaining in the lung after a forced expiration.



**By: -**

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