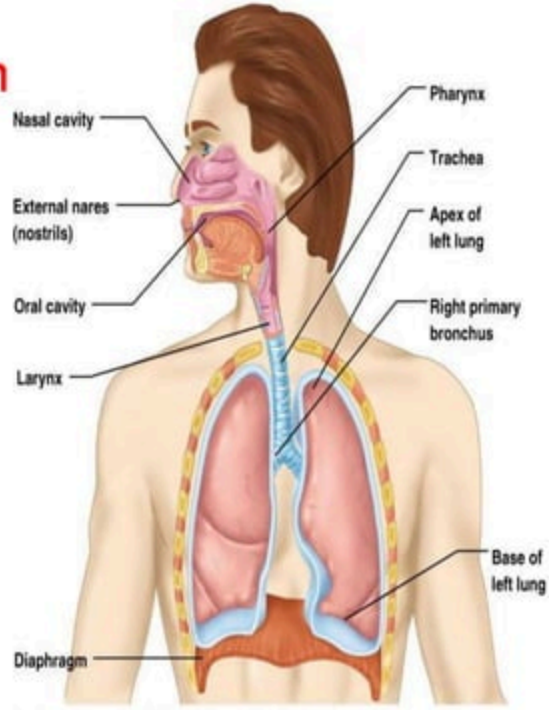
AHMED KHALIL IBRAHIM

The Respiratory System

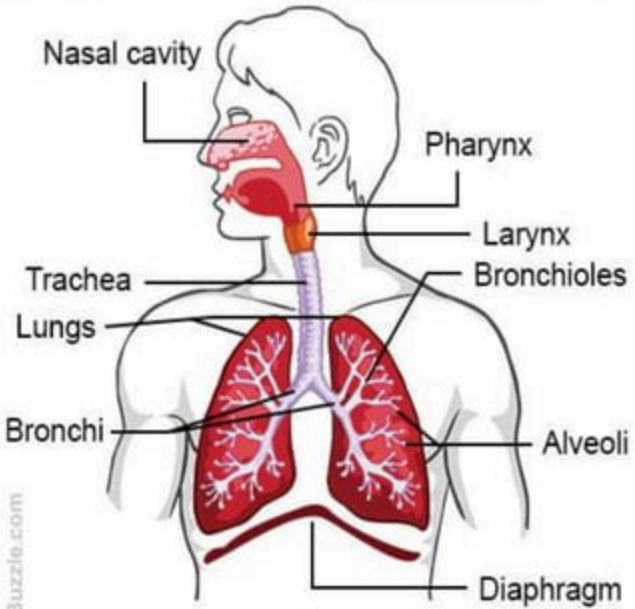
Introduction to the Human Respiratory System

- The Respiratory System is what controls breathing. It brings in the oxygen your body needs and gets rid of the carbon dioxide that is left over. If you didn't breathe you would pass out or die.



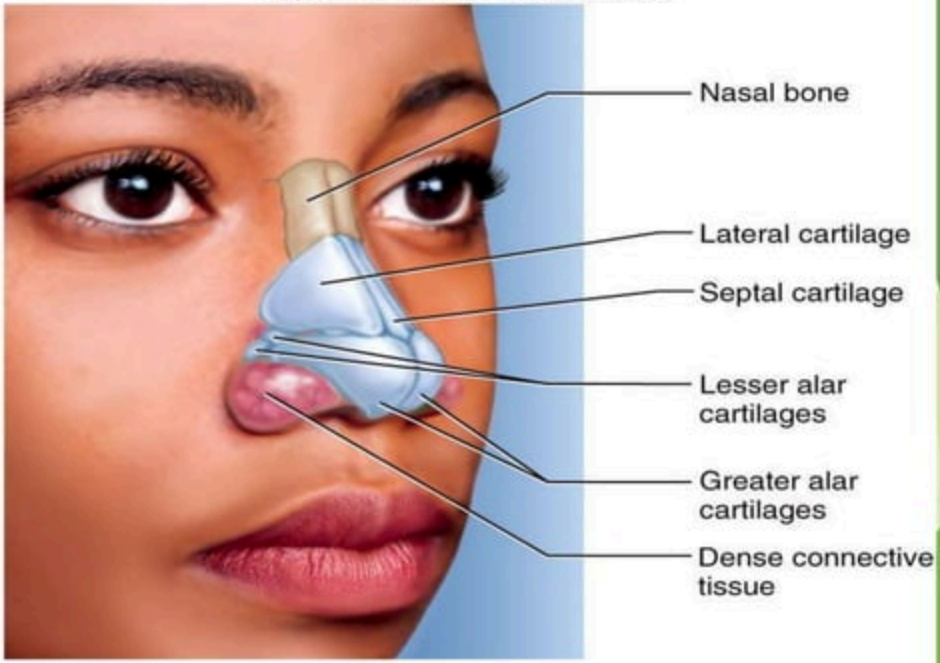
Organs of the Respiratory system

- Nose (Paranasal Sinuses)
- Pharynx
- Larynx
- Trachea
- Bronchi
- Lungs – alveoli



Nose

- External portion composed of cartilage and bone covered with skin.
- Entrance to nose = nostrils or nares
- Air enters body through the nose and mouth.
- Nasal cavity:
- Divided into left and right chambers by dividing wall called the septum
- As air enters through nose, it passes into the nasal cavity
- Function of nose:
- produces mucus; filters, warms, and moistens incoming air; resonance chamber for speech



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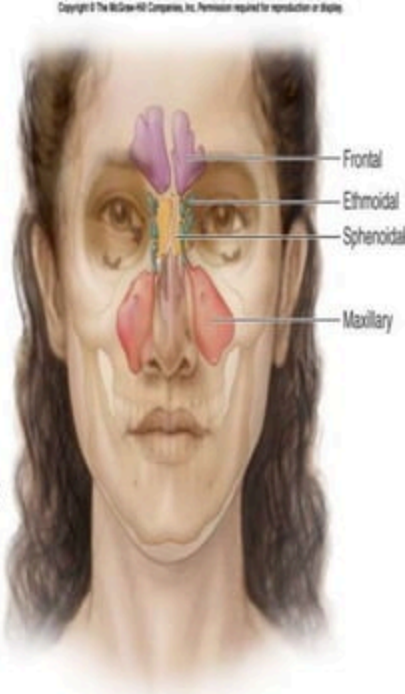
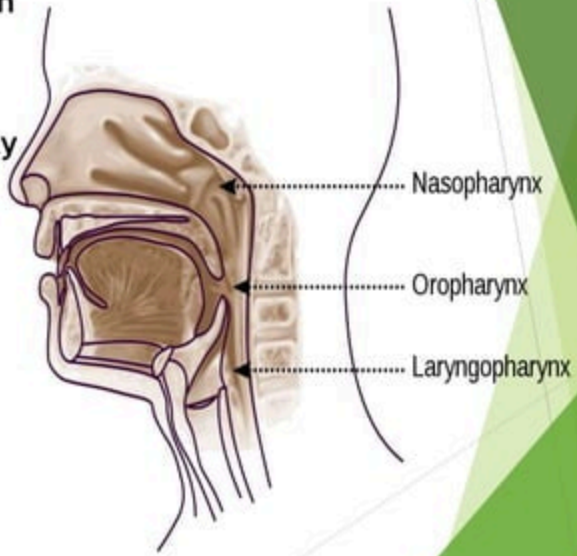
Paranasal Sinuses

- Cavities within bones surrounding the nasal cavity:
  - Frontal bone
  - Sphenoid bone
  - Ethmoid bone
  - Maxillary bone
- Function of the sinuses:
  - Lighten the skull
  - Act as resonance chambers for speech
  - Produce mucus that drains into the nasal cavity



Pharynx

- Airway that connects the mouth and nose to the larynx.
- Also known as the throat.
- Serves as a common passageway for both air and food.
- Commonly divided into three sections:
- **Nasopharynx** : Contains the adenoids.
- **Oropharynx** : Contains the tonsils (palatine tonsils).
- **Laryngopharynx.**



Larynx (voice box).

Connects pharynx with trachea.

Functions:

Prevent bolus from entering trachea & lungs.

Produce sound.

9 separate cartilage units that form the "voice box".

Three main "single" cartilages:

Thyroid cartilage - (Adam's apple in males)

Cricoid cartilage - ring at the base of the thyroid cartilage

Epiglottis: connective tissue framed by hyaline cartilage

Three smaller pairs of cartilages:

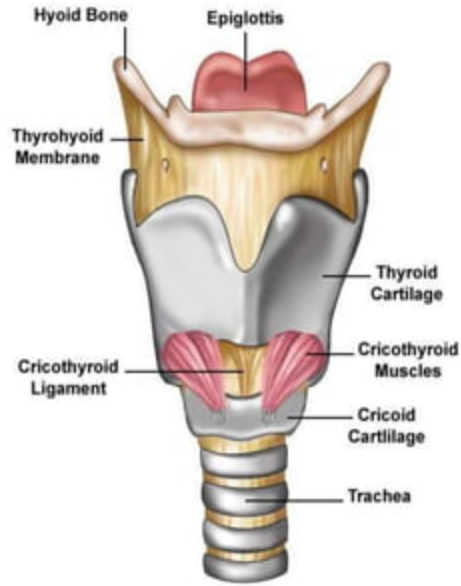
Arytenoid

Cuneiform

Corniculate cartilages

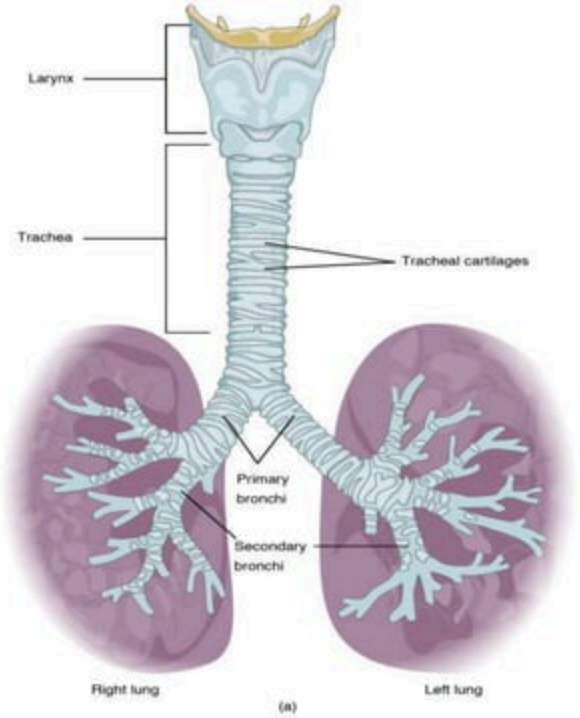
Vocal cords:

Vibrate with expelled air to create sound (speech).



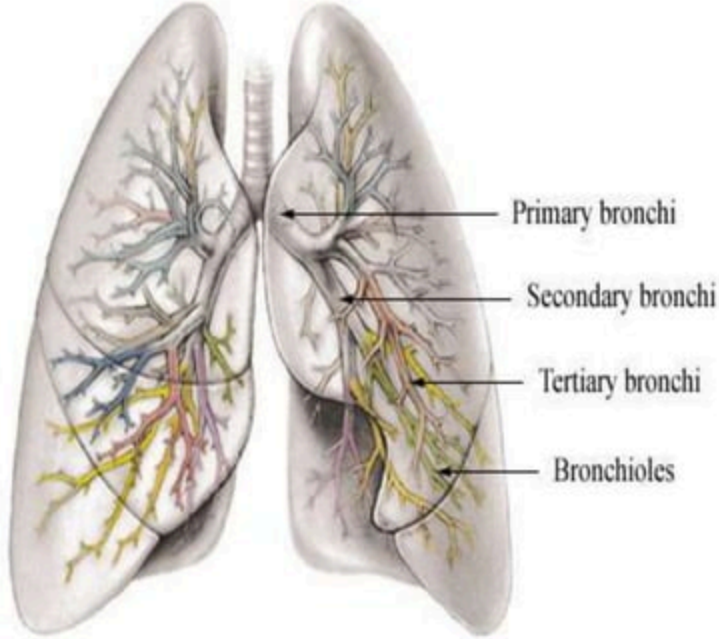
Trachea (windpipe)

- Flexible tube running from larynx and dividing inferiorly into two main (primary) bronchi; walls contain C-shaped cartilages that are incomplete posteriorly where trachealis muscle occurs
- **Functions:**
- Air passageway; filters, warms, and moistens incoming air



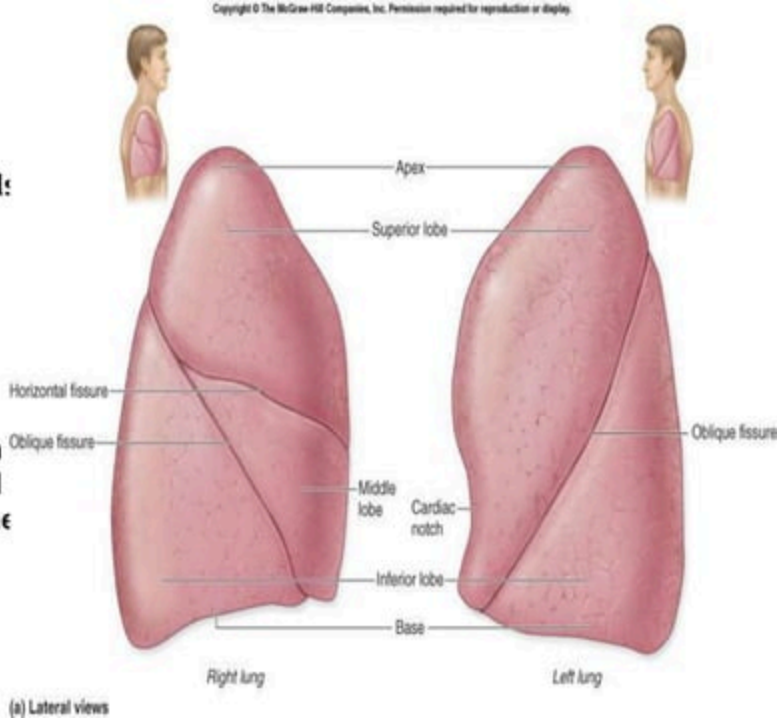
Bronchi

- Consists of right and left main bronchi, which subdivide within the lungs to form lobar (secondary) and segmental (tertiary) bronchi, smaller bronchi, and bronchioles; bronchial walls contain complete layer of smooth muscle; constriction of this muscle impedes expiration



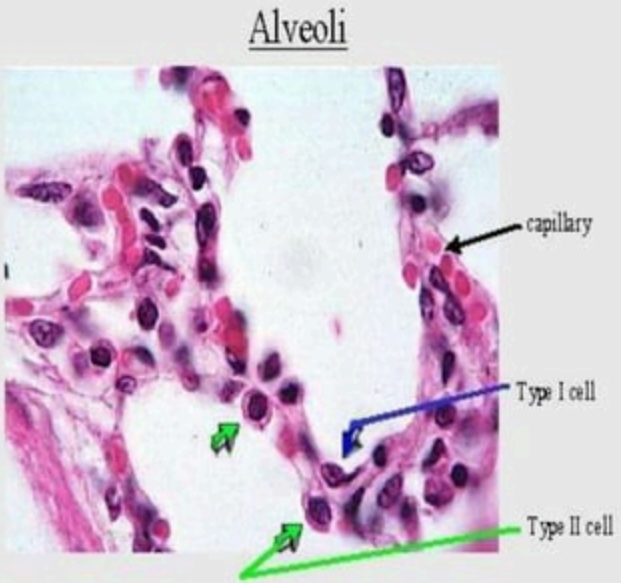
Lungs

- Two cone-shaped, spongy organs consisting of alveoli, blood vessels elastic tissue, and nerves.
- Left lung has two lobes and right lung has three lobes
- Apex = uppermost part of lung
- Base = lower part of lung
- Hilum = portion in midline region where blood vessels, nerves, and bronchial tubes enter and exit the lungs



Alveoli

- Microscopic chambers at end of bronchial tree;
- Type I cells : simple squamous cells forming lining.
- Type II cells : or septal cells secrete surfactant.
- Alveolar macrophages.

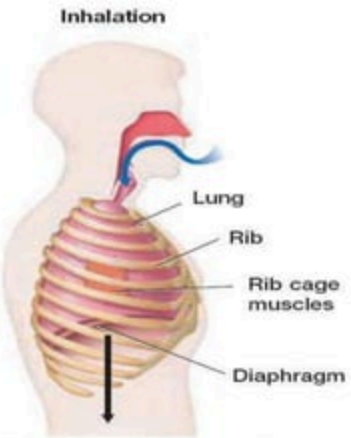


Mechanism of Breathing ?(Pulmonary Ventilation)

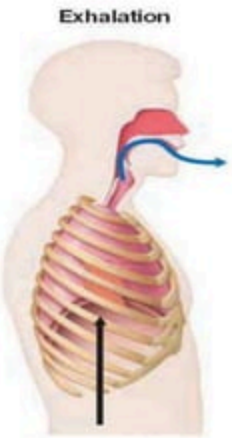
- Inhalation = inspiration :
- Diaphragm is stimulated by phrenic nerve
- Diaphragm contracts and flattens (descends)
- Chest cavity enlarges
- Decrease in pressure within the thorax
- Air is drawn into the lungs

- Exhalation = expiration
- Diaphragm relaxes and rises back into thoracic cavity
- Chest cavity decreases in size
- Increase in pressure with the thorax
- Air is forced out of lungs

Inhalation and Exhalation



When the diaphragm contracts, it moves down and air rushes in.



When the diaphragm relaxes, it moves up and air is forced out.

Respiratory System Functions

1. supplies the body with oxygen and disposes of carbon dioxide.
2. filters inspired air
3. produces sound
4. contains receptors for smell
5. rids the body of some excess water and heat
6. helps regulate blood pH