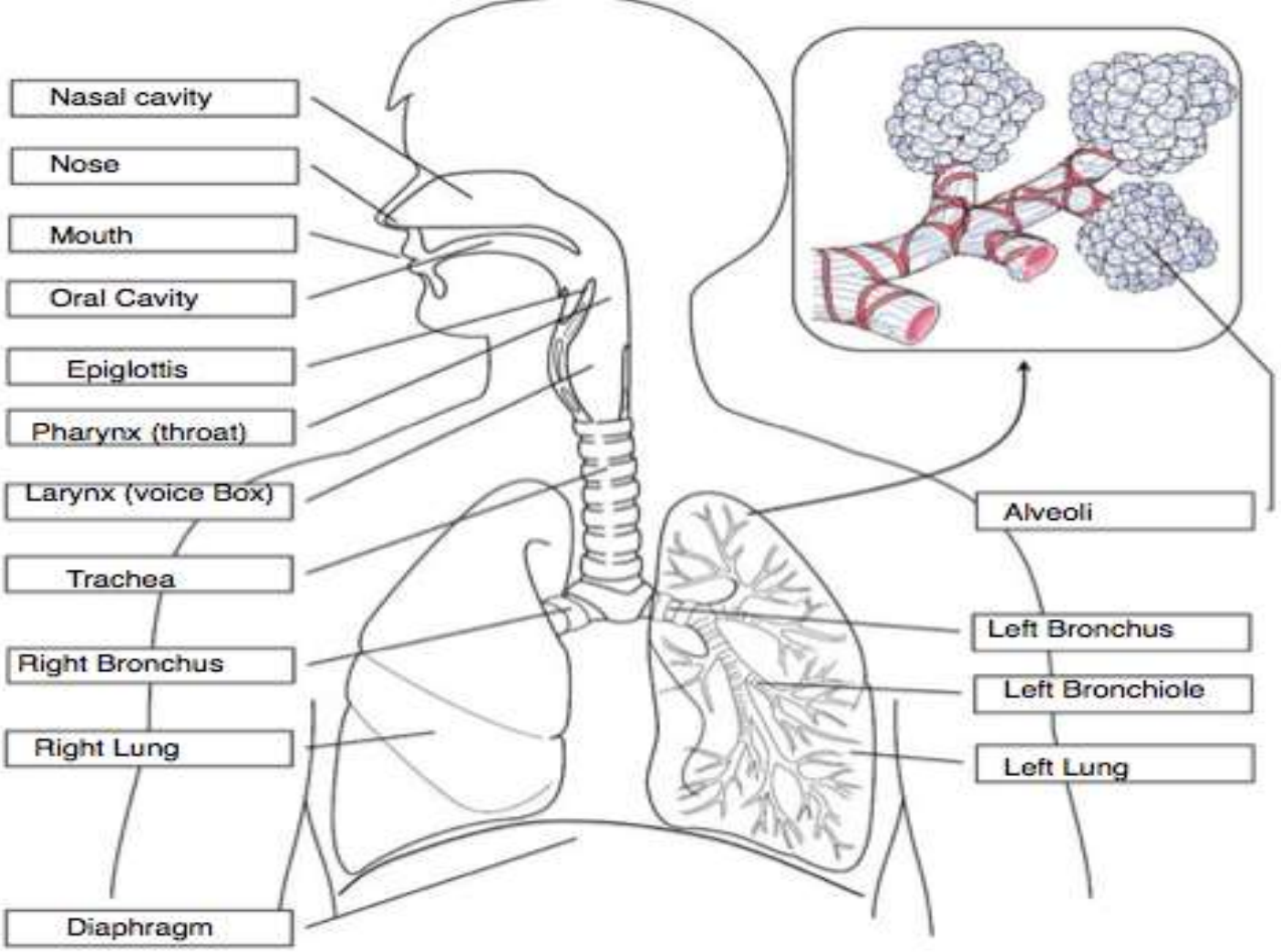


Respiratory System Notes

- While watching the following video, takes notes on the different structures of the respiratory system on your diagram worksheet.

Video Clip

Respiratory System Functions

- Gas exchange between the blood and external environment
- Exchange of Oxygen & Carbon Dioxide takes place within the lungs in the ***alveoli***
- Purify, warm, and humidify the incoming air
- Produce sound for communication

Nonrespiratory Functions

- Actions can be caused by reflexes or voluntary actions
- Examples:
  - **Cough** – clears lungs of debris
  - **Sneeze** – clears upper respiratory tract
  - **Yawn** – deep inspiration triggered by ???
  - **Hiccup** – ***phrenic nerve*** is irratated which leads to rhythmic spasms.

Organs of the Respiratory system

- Nose
- Pharynx
- Larynx
- Trachea
- Bronchi
- Lungs – alveoli

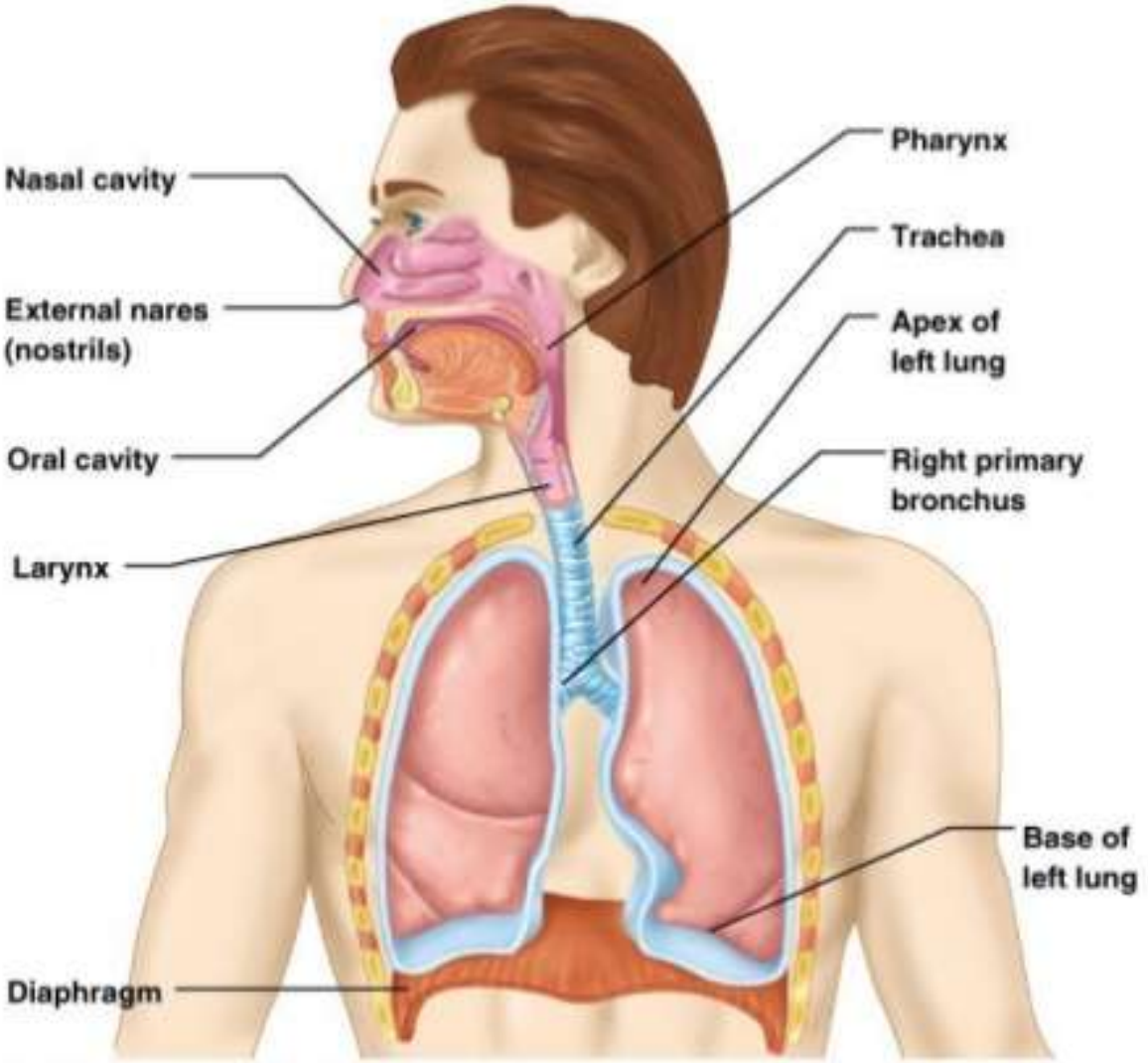
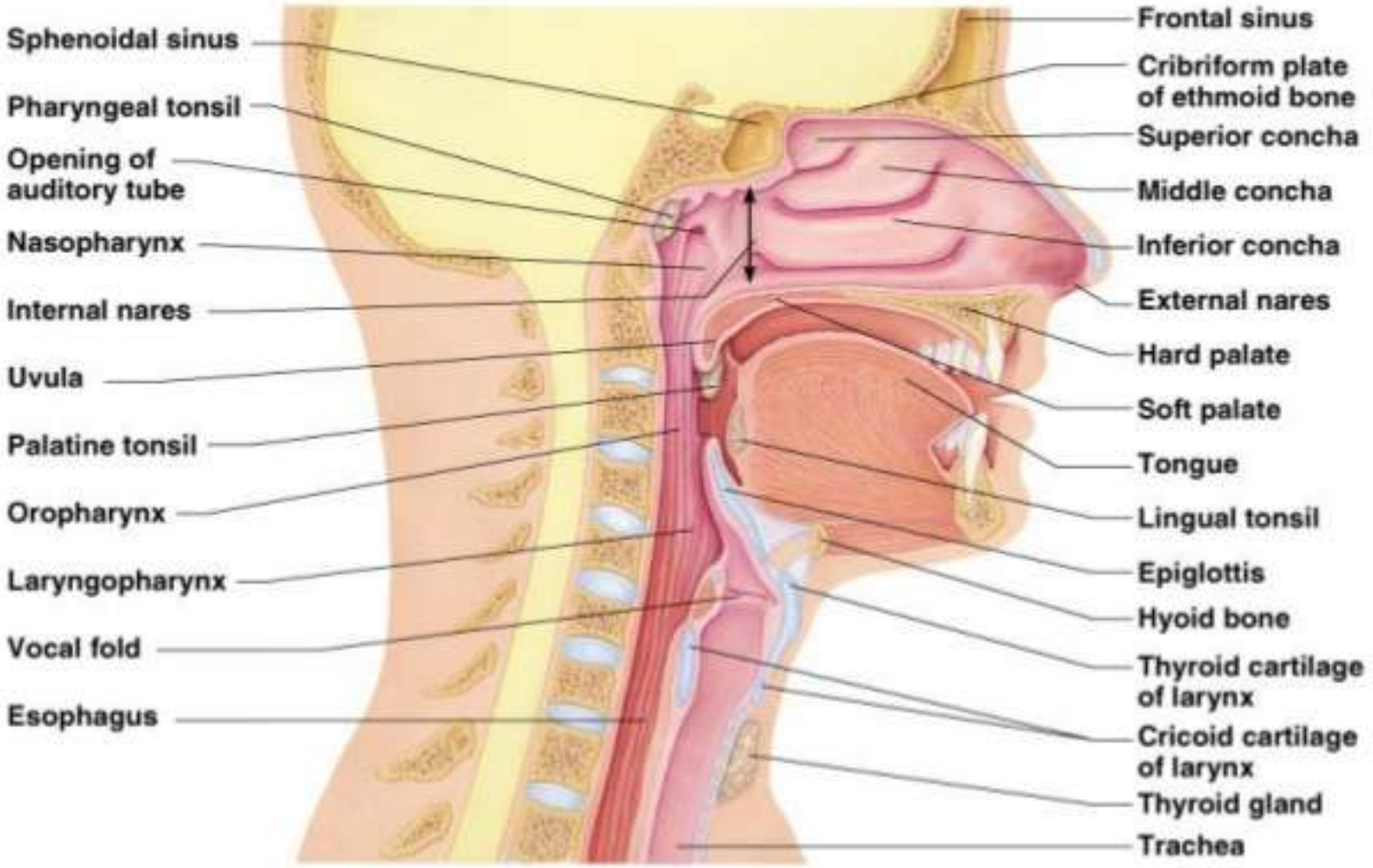


Figure 13.1

The Nose

- The only externally visible part of the respiratory system
- Air enters the nose through the external nares (nostrils)
- The interior of the nose consists of a nasal cavity divided by a nasal ***septum***

Upper Respiratory Tract



Nasal Cavity

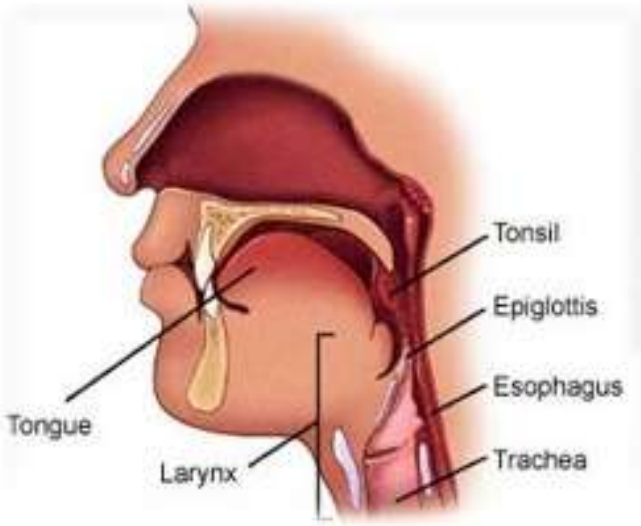
- Lateral walls have projections called ***conchae***
- Nasal cavity is separated from the oral cavity by the ***hard*** & ***soft palates***
- Olfactory receptors are located in the mucosa on the superior surface
- Cavity is lined with respiratory ***mucosa***
  - Moistens air
  - Traps incoming foreign particles

Pharynx (Throat)

- Muscular passage from nasal cavity to larynx
- Three regions of the pharynx:
  - Nasopharynx – superior region behind nasal cavity
  - Oropharynx – middle region behind mouth
  - Laryngopharynx – inferior region attached to larynx
- Oropharynx & laryngopharynx are the passageways for air & food

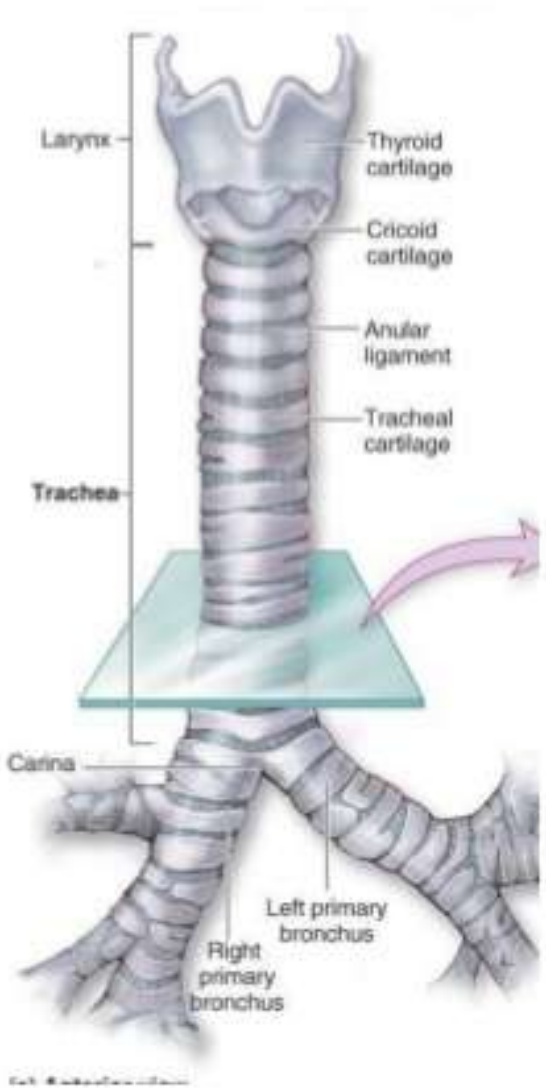
Larynx

- Vocal cords (vocal folds)
- Glottis – opening between vocal cords
- Thyroid cartilage
  - Largest hyaline cartilage
  - "Adam's apple"
- Epiglottis
  - Superior opening of the larynx
  - Routes food to the larynx and air toward the trachea



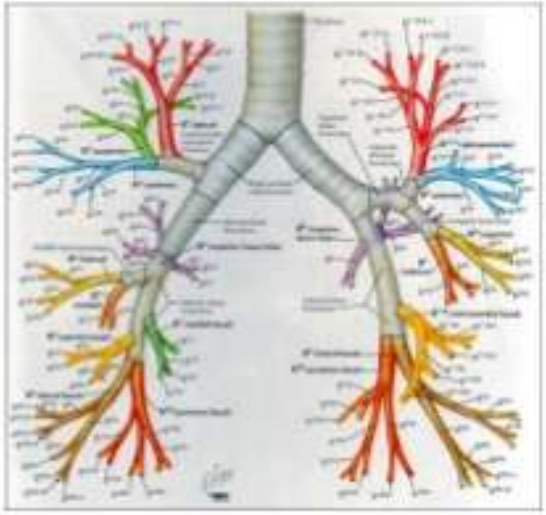
Trachea (Windpipe)

- Connects larynx with bronchi
- Lined with ciliated mucosa
  - Beat continuously in the opposite direction of incoming air
  - Expel mucus loaded with dust and other debris away from lungs
- Walls are reinforced with C-shaped hyaline cartilage



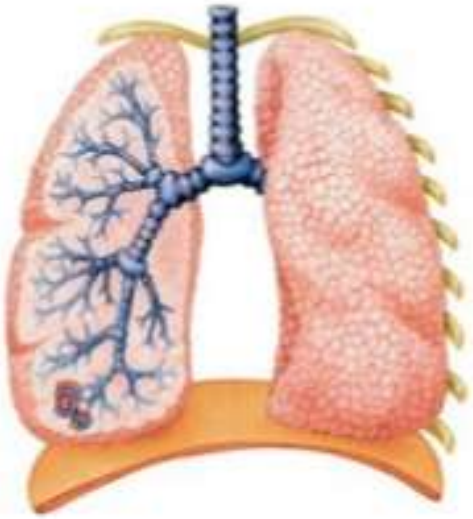
Primary Bronchi

- Formed by division of the trachea
- Enters the lung at the hilus (medial depression)
- Right bronchus is wider, shorter, and straighter than the left
- Bronchi subdivide into smaller and smaller branches



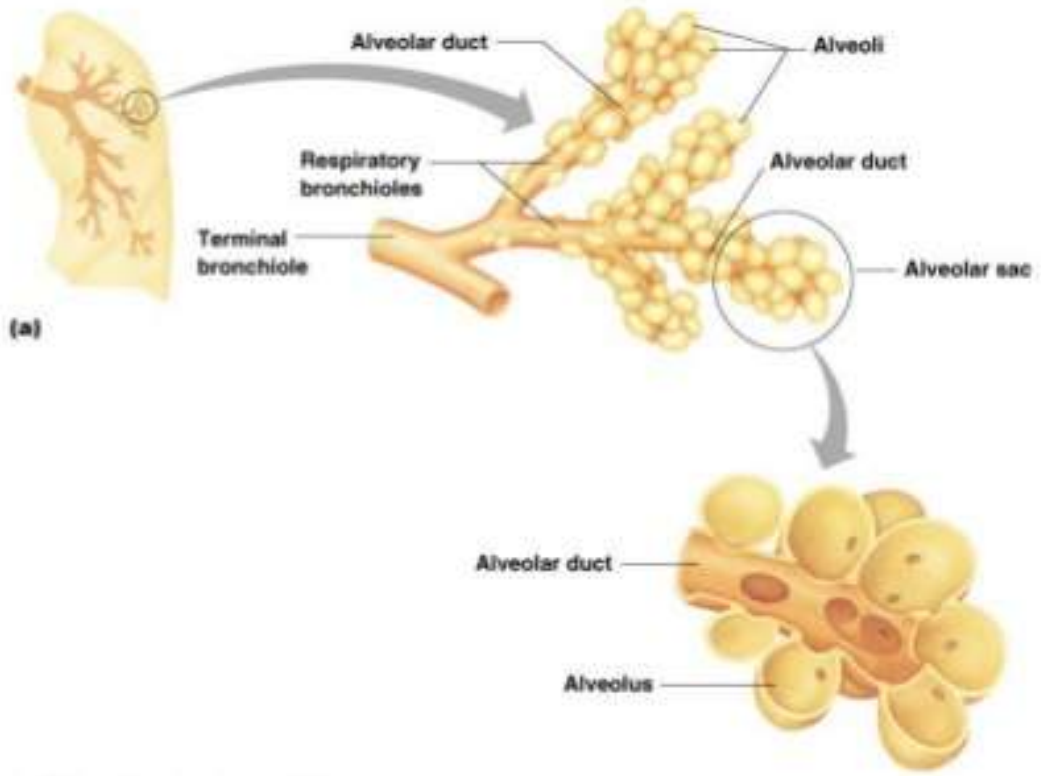
Lungs

- Site of gas exchange
- Occupy most of the thoracic cavity
  - Apex is near the clavicle (superior portion)
    - Base rests on the diaphragm (inferior portion)
  - Each lung is divided into lobes
    - Left lung – two lobes
    - Right lung – three lobes



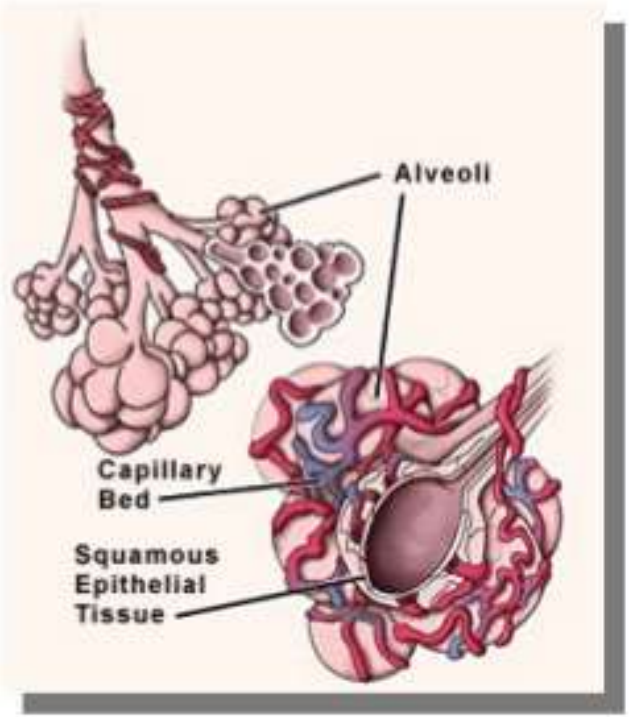
Bronchioles

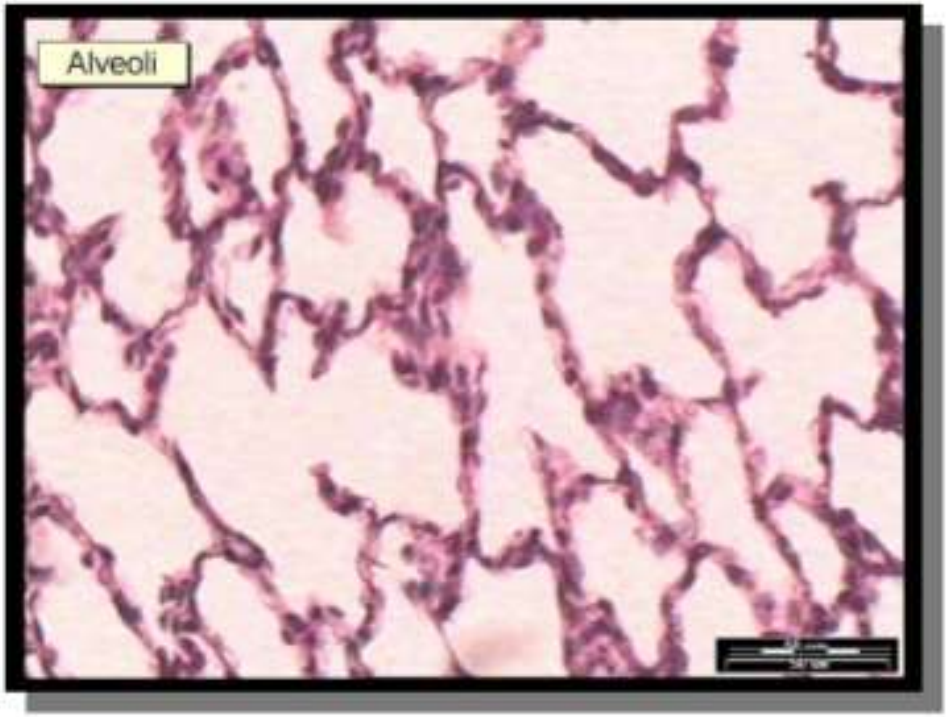
- Smallest branches of the bronchi
- Terminal bronchioles end in alveoli
- All but the smallest branches have reinforcing cartilage

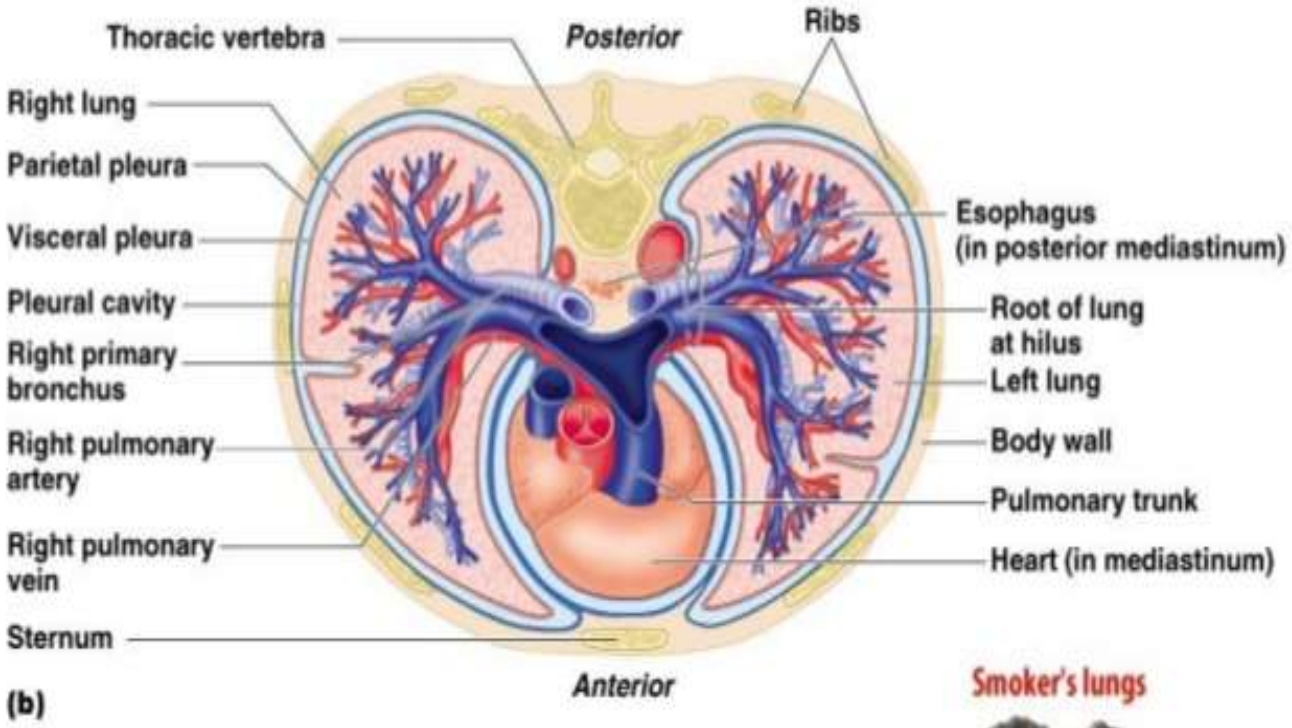


Alveoli

- Gas exchange takes place within the alveoli in the respiratory membrane
- Tiny blood capillaries surround alveoli and allow for simple diffusion of O_2 & CO_2







Coverings:

Parietal Pleura: inner lining

Visceral Pleura: outer lining

Pleural Cavity: Space between the two- purpose?

Mechanics of Breathing

Inspiration

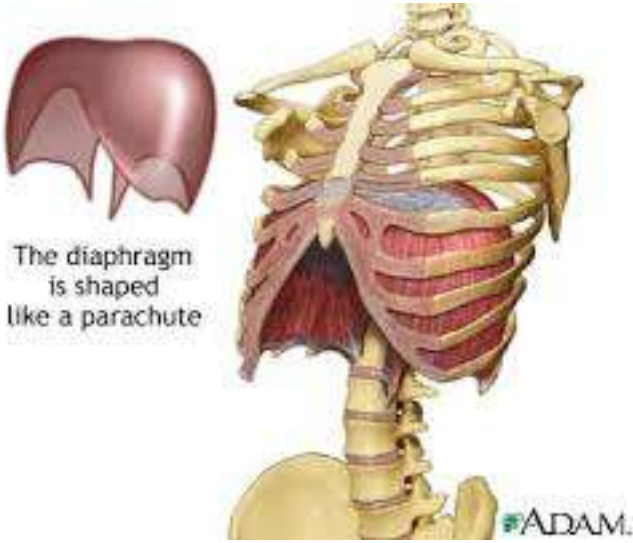
- ***Diaphragm*** and ***intercostal*** muscles contract
- The size of the thoracic cavity increases
- External air is pulled into the lungs due to an increase increased volume

Exhalation

- As muscles relax, air is pushed out of the lungs
- Forced expiration can occur mostly by contracting internal intercostal muscles to depress the rib cage

The Diaphragm-

- Function: muscle of respiration
- Location: separates abdominal cavity and thoracic cavity.
- Triggered by: Phrenic Nerve
- Inspiration: Pressure in lungs is decreased and air comes in.
- Expiration: Pressure in lungs is increased and air pushes out. Diaphragm appears dome shaped.



Pathology- **Upper respiratory disorders**

- ***Croup**-Acute viral infection of infants with obstruction of the larynx, accompanied by barking cough and stridor. Caused by flu or respiratory syncytial virus.

- **Diphtheria-**Inflammation, opaque membrane forms in larynx and trachea. Caused by bacterial infection. DPT vaccine available.

- ***Epistaxis-**nosebleed, usually associated with irritation of nasal mucous membranes, trauma, vit K deficiency, clotting abnormalities, hypertension or blood thinning meds.

- ***Pertussis-**Whooping cough, highly contagious bacterial infection of pharynx, larynx, and trachea. Violent, sudden spasms of coughing that ends in a loud “whooping” sound.

Bronchial tube disorders

- ***Asthma**-Chronic bronchial inflammatory disorder with airway obstruction due to brachial edema and construction and increased mucus production.

- ***Bronchiectasis**-chronic dilation of bronchus, secondary infection. Caused when bronchi lose elasticity & secretions puddle and don't drain normally.

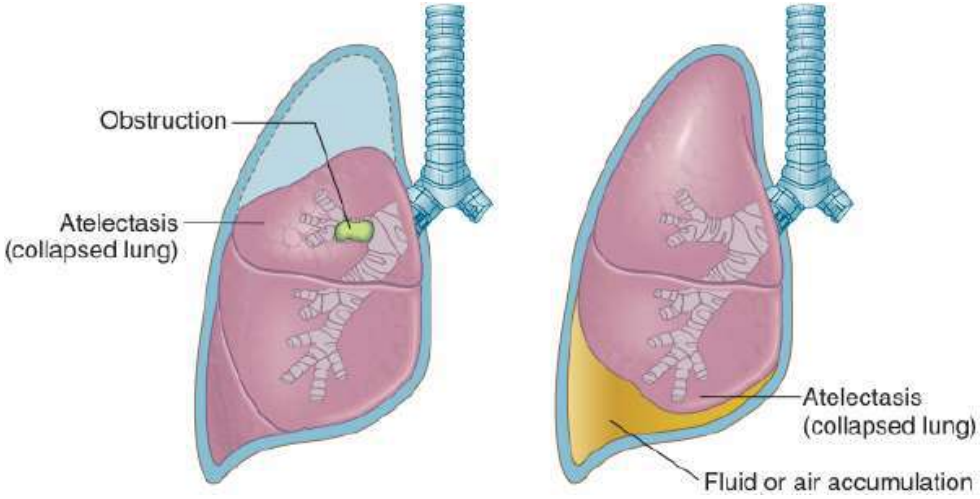
- **Chronic bronchitis-** Inflammation of bronchi persisting over a long time; type of COPD. Infection and smoking are factors.

- ***Cystic fibrosis-** inherited disorder of exocrine glands where thick mucous secretions form in resp. system and don't drain properly. Caused by a genetic mutation of a gene. Symptoms are; airway obstruction, bronchiectasis, resp. failure, insufficient secretions of digestive enzymes which leads to poor growth.

Pathology
Lung Disorders

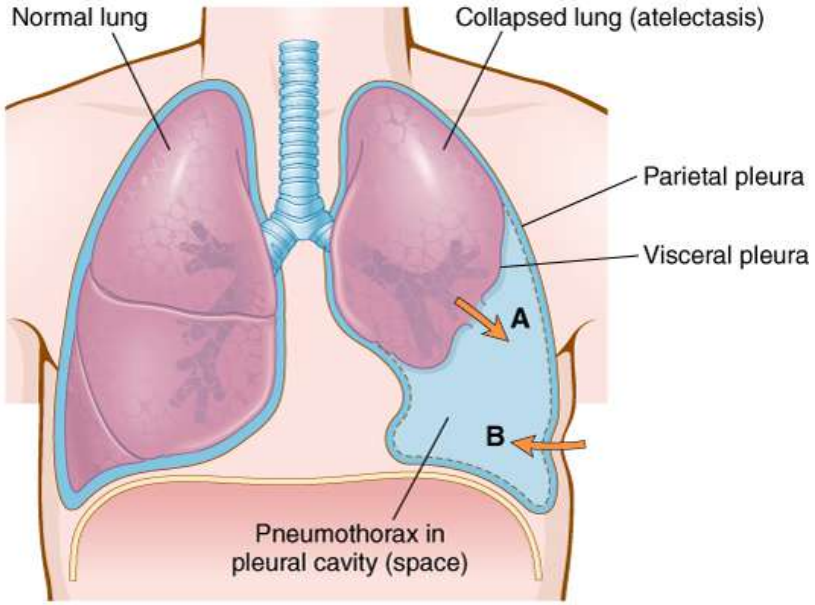
***Atelectasis**

- Two forms
- Proximal obstruction of distal airways
- Accumulations of fluid, blood, or air in the pleural cavity



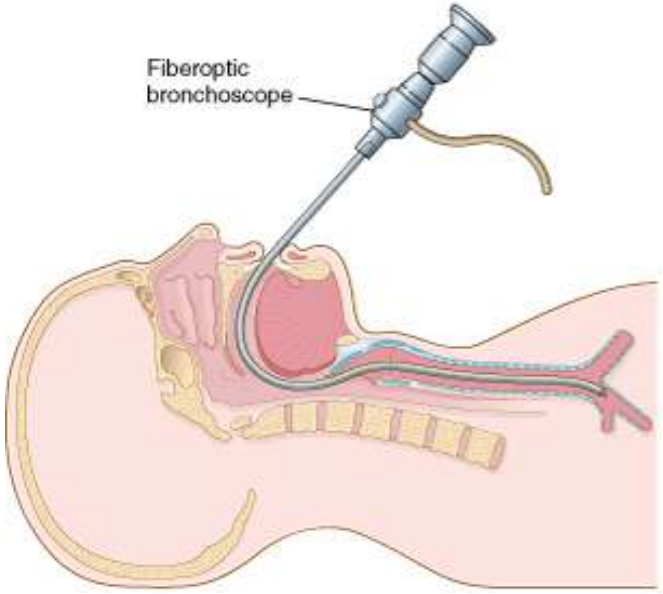
Pathology
Pleural Disorders

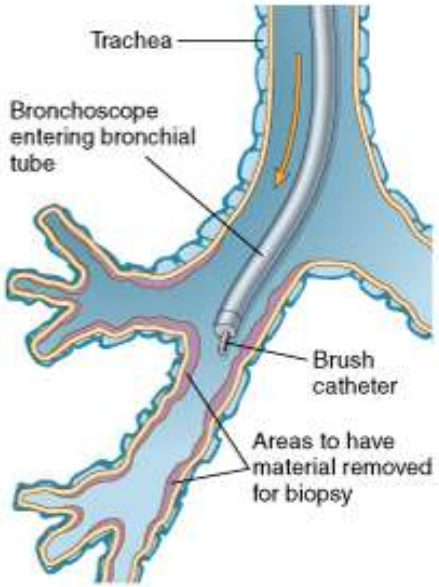
***Pneumothorax:** Air gathers in the pleural cavity



Clinical Procedures

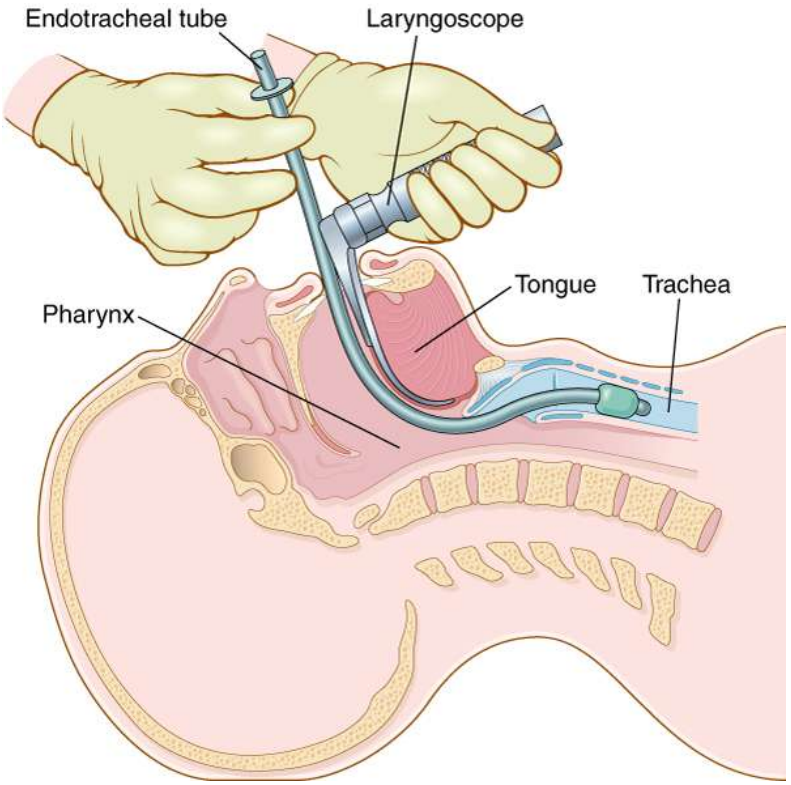
***Bronchoscopy:** fiberoptic or rigid endoscope inserted into the bronchial tubes for diagnosis, biopsy, or collection of secretions





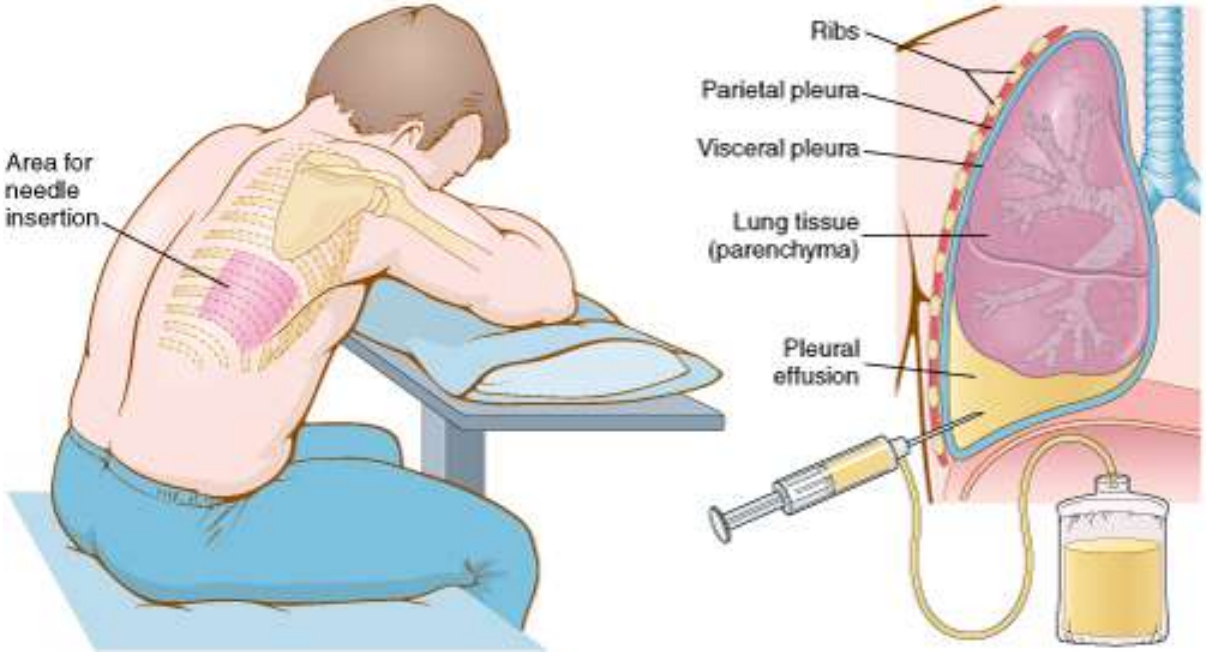
Clinical Procedures

***Endotracheal intubation:** placement of tube from mouth to trachea to establish airway



Clinical Procedures

***Thoracentesis:** surgical puncture to remove fluid from pleural space



Clinical Procedures

***Tracheostomy:** surgical creation of an opening into the trachea through the neck