

- Left lung – smaller, 2 lobes separated by oblique fissure
 - 8-9 bronchopulmonary segments
- Right lung – three lobes separated by oblique and horizontal fissure
 - 10 bronchopulmonary segments
- Lobules are the smallest subdivisions, served by bronchioles and their branches
- Trachea → primary bronchi → secondary (segmental) bronchi → tertiary bronchi → bronchioles → terminal bronchioles
- **Respiratory zone:** site of gas exchange – microscopic structures: respiratory bronchioles, alveolar ducts and alveoli
- **Conduction zone:** conducts air to gas exchange sites – includes all other structures
 - Branches from trachea to terminal bronchioles are conducting airways. They do not participate in gas exchange!!
- Respiratory muscles: diaphragm, intercostals, etc.
- **Pulmonary Lobule** = functional unit of respiratory system
 - Lymphatic vessel, arteriole, capillary bed, venule, terminal bronchiole and alveolar sacs
- Transpulmonary pressure = 4 mmHg (760-756 mmHg) keeps airways open, the greater the trans pressure, the larger the lungs
- Intrapleural pressure = -4 mmHg (756 mmHg) fluctuates with breathing but always a negative pressure
- Intrapulmonary / intra-alveolar pressure = 0 mmHg (760 mmHg) fluctuates with breathing (758 when air comes in, 762 when air goes out)
- Inhalation is active, exhalation is passive (AT REST)
- **Boyles Law:** pressure of a gas in a closed container is inversely proportional to the volume of the container
- Inspiratory muscles consume energy to overcome factors that hinder air passage and pulmonary ventilation:
 - Airways resistance – friction; $F = \frac{\Delta P}{R}$; resistance is usually insignificant
 - COPD narrows / obstructs airways, greater pressure differences are needed to maintain flow, ATM pressure doesn't change so intrapulmonary pressure has to
 - Emphysema, chronic bronchitis
 - Alveolar surface tension
 - Lung compliance – amount of effort needed to stretch lungs and chest wall; elastic fibers!
 - Decreased compliance – scar tissue from tuberculosis, or pulmonary edema; emphysema – destruction of alveolar wall leaving an air pocket, destruction of elastic fibers → lungs inflate easily but elastic recoil doesn't work
- **Lung Volumes and Capacities**
 - Normal breathing = 12 breaths/min
 - Normal volume air inspired and expired = 500mL (TIDAL VOLUME)
 - Minute ventilation = total volume of air inhaled and exhaled each minute; breathing frequency x TV