

RESPIRATORY SYSTEM

EQ: Why do you breath out?

- I. Primary Functions
 - a. Gas Exchange (oxygen and CO₂)
 - b. Voice Production
 - c. Olfaction - Sense of smell
 - d. Control blood pH (using CO₂)
- II. Gas Exchange – Main Steps
 - a. Move air into lungs
 - b. External respiration – exchange O₂ & CO₂ with blood and air
 - c. Move gases through blood flow
 - d. Internal respiration – exchange O₂ & CO₂ with body cells and blood
- III. The Main Players: Trachea > Primary bronchi--> bronchioles --> alveolar ducts --> alveoli
 - a. LUNGS - spongy tissue that sit within the pleural cavity
 - i. Right Lung = 3 lobes
 - ii. Left Lung = 2 lobes
 - iii. Serous fluid lubricates lungs during breathing
- IV. BREATHING MECHANISM
 - a. EXHALATION
 - i. As the diaphragm and other muscles relax, ELASTIC RECOIL from surface tension forces air out.
 - ii. Muscles can force extra air out or in
 1. Diaphragm moves down, forcing air into airways
 2. Intercostal muscles contract, enlarging cavity even more
 3. Membranes move with the contractions
 4. Surface tension in alveoli and surfactant keep them from collapsing
 5. Other muscles (pectoralis minor and sternocleidomastoid) can force a deeper breath
- V. NON RESPIRATORY MOVEMENTS
 - a. Coughing, sneezing, laughing, crying
 - b. Hiccup - spasm of the diaphragm
 - c. Yawn - possibly causes by low oxygen levels
- VI. Lung Capacity
 - a. **Resting Tidal Volume** - amount of air that enters the lungs during one cycle
 - b. **Reserve volumes** - air that can be forced out/in
 - c. VITAL CAPACITY = Insp reserve + Exp reserve + Tidal Volume
 - d. INSPIRATORY CAPACITY = Tidal Volume + Insp Reserve Volume
 - e. FUNCTIONAL RESIDUAL CAPACITY is the volume of air that remains in the lungs at rest
 - f. TOTAL LUNG CAPACITY varies by sex, age, body size, athletics
- VII. Breathing
 - a. Breathing is involuntary, but muscles are under voluntary control
 - b. Respiratory Center – groups of neurons in the brain that control inspiration and expiration
 - i. based in the medulla and the pons
 - c. Factors Affecting Breathing
 - i. Chemosensitive areas – detect concentrations of chemicals like carbon dioxide and hydrogen
 - ii. Rise in CO₂

- iii. Low blood oxygen (peripheral chemoreceptors, carotid and aortic bodies, sense changes)
- iv. Inflation reflex – regulates the depth of breathing, prevents over inflation of the lungs
- v. Emotional upset, fear and pain