

RESPIRATORY SYSTEM

1. The entire process of gas exchange between the atmosphere and body cells is called respiration.
2. The epiglottis lies at the top of the larynx and prevents food from entering the respiratory passages during swallowing. Air moves from the larynx into the trachea, which is reinforced or stiffened by rings of cartilage. The trachea divides into 2 main bronchi that enter the lungs.
3. Respiratory bronchioles divide into alveolar duct which end in tiny air sacs called alveoli.
4. Alveoli are surrounded by capillaries and are the sites of gas exchange.
5. The air passageways are lined with cilia to sweep foreign particles up and away from the lungs.

Topic: Respiratory Organs

6. The alveolar epithelium consists primarily of simple squamous
7. Type I squamous alveolar cells allow for rapid gas exchange.
Type II alveolar cells secrete surfactant, a chemical that reduces surface tension.

Topic: Mechanics of Ventilation

8. The mechanics of breathing involve changing the volume and pressure of the thoracic cavity.
9. The intercostal muscles contract and elevate the rib cage. The diaphragm contracts (and drops downward), which expands the thoracic cavity. These events decrease its internal pressure.
10. Boyle's Law says that when the volume of a space expands (gets larger) the pressure decreases.
11. During inspiration:
 - Rib cage moves up and out
 - Diaphragm contracts and moves down
 - Pressure in the lungs decreases
 - Air comes rushing in
12. During expiration:
 - Ribs and diaphragm return to resting state
 - Which decreases the volume of the chest cavity
 - This increases the pressure inside the lungs
 - And forces the air out

Topic: Gas Exchange

13. During gas exchange in the lungs, oxygen diffuses from the alveoli to the capillaries, while carbon dioxide moves in the opposite direction.

Topic: Gas Transport

14. Each hemoglobin molecule contains 4 iron-containing heme groups. Each heme unit binds to 1 oxygen molecule.

15. Oxygen is carried in the blood bound to hemoglobin in the red blood cells. Carbon dioxide dissolves in the blood plasma, where most of it forms Carbonic acid (H_2CO_3), which dissociates to form bicarbonate (HCO_3^-) and hydrogen ions (H^+).