

BMD 330 and 335: Human Physiology
Chapter 18 Objectives

The Respiratory System: Gas Exchange and Regulation of Breathing

1. Describe the circulatory pathway for oxygenated and deoxygenated blood. Describe the exchange of gas in the lungs and in systemic tissues.
2. List the normal partial pressures of oxygen and carbon dioxide in arterial and mixed venous blood, and explain how they contribute to the exchange of gases.
 - a. Explain Dalton's Law of partial pressures.
 - b. Describe the solubility of gases in a liquid.
3. Describe the mechanisms of oxygen transport in the blood.
 - a. Describe the role of hemoglobin in the transport of oxygen, carbon dioxide, and H^+
 - b. Describe the oxygen-hemoglobin dissociation curve
 - c. Explain the effects of temperature, pH, and 2,3-DPG on the oxygen-hemoglobin dissociation curve
4. Describe the transport of carbon dioxide in blood
 - a. Explain the relationship between the P_{CO_2} of blood and the pH of blood.
 - b. Describe the actions of carbonic anhydrase in erythrocytes as blood passes through the systemic and pulmonary circulations.
5. Describe the neural mechanisms that establish the respiratory rhythm. Distinguish between the respiratory centers that establish the rhythm and those that regulate the rhythm.
6. Explain the role of peripheral and central chemoreceptors in the control of ventilation.
7. Explain how carbon dioxide affects ventilation.
8. Describe how changes in PO_2 and PCO_2 in lung tissues can alter ventilation. Explain the ventilation-perfusion ratio.
9. Explain how the respiratory system regulates acid-base balance of the blood by varying the rate of carbon dioxide expiration.