

Respiratory System

Required:

1. Describe the organs and structures that make up the respiratory system.
2. Distinguish the respiratory zone from the conducting zone.
3. Describe the functions of the conducting zone in warming, filtering and humidifying air.
4. Describe the close relationship between alveoli and capillaries (i.e. the respiratory membrane) and how the structural relationship aids in gas exchange by diffusion.
5. Generally describe the different phases of respiration including ventilation, gas exchange between alveoli and blood, gas transport, gas exchange between blood and cells, and cellular respiration
6. Describe the structure of the pleural membranes and the relationship between the lung and the pleural membranes.
7. Describe the inverse relationship between changes in pressure and changes in volume (Boyles Law).
8. Describe the relationships among air flow, the pressure gradient and resistance (i.e. flow = pressure gradient/resistance).
9. Describe the process of pulmonary ventilation (inhalation/exhalation).
10. Define atmospheric, alveolar (intrapulmonary) and intrapleural pressures and indicate how these pressures change during pulmonary ventilation.
11. Relate the changes in the above pressures during ventilation to changes in the volume of the thoracic cavity during inspiration and expiration.
12. Explain how the difference between the alveolar and intrapleural pressure functions to prevent the lung from collapsing.
13. Describe the factors that determine lung compliance and the importance of surfactant.
14. Describe spirometry and explain why it is a valuable clinical tool.
15. Define tidal volume and residual volume.
16. Define anatomical dead space.

17. Calculate and define minute respiratory volume.
18. Use the concept of partial pressure as a way of describing the concentration of gases in air and blood.
19. Describe the transport of CO_2 and O_2 across the alveolar and capillary membranes by diffusion and the relationship between the partial pressure gradient of a gas and its rate of diffusion.
20. Describe how the partial pressures of CO_2 and O_2 normally vary in the lung and in arterial and venous blood.
21. Describe how changes in alveolar ventilation affect the alveolar and arterial partial pressures of CO_2 and O_2
22. Describe the primary ways that O_2 is carried in the blood and the relative importance of each method of transport.
23. Describe how O_2 binds to hemoglobin and how the amount of oxygen bound to hemoglobin is affected by CO_2 , pH, and temperature.
24. Understand how the effects of the CO_2 , pH and temperature facilitate hemoglobin loading of oxygen in the lungs and unloading of oxygen at the tissues.
25. Describe the primary ways that CO_2 is transported in blood and the relative importance of each method of transport.
26. Describe how plasma CO_2 and pH are related (i.e. the bicarbonate/ CO_2 equilibrium?) Understand the effects of the plasma CO_2 concentration on this equilibrium.
27. Describe how alveolar ventilation is controlled (include the controlled variables, receptors, integrating center and effectors).