

RESPRATORY SYSTEM

Answers to WHAT DID YOU LEARN?

1. Inhaled gases are warmed, humidified, and cleansed of particles as they are inhaled.
2. The mucus lubricates the epithelial surface and prevents its dehydration. Mucus traps inhaled dust, dirt particles, microorganisms, and pollen, and also humidifies the inhaled air.
3. Nasal conchae help produce air turbulence in the nasal cavity. Because of the turbulence, the air remains in the nasal cavity for a longer period of time, allowing it to come into contact with the mucosa and become conditioned. Without the nasal conchae, air would pass quickly through the nasal cavity and not be sufficiently conditioned before entering the rest of the respiratory system.
4. Material from the oral cavity and oropharynx is blocked from entering the nasopharynx by the soft palate of the mouth. When swallowing, skeletal muscles in the soft palate contract, elevating the soft palate and sealing off the nasopharynx to prevent food from entering the nasopharynx.
5. The vocal folds vibrate to produce sound when air passes between them while they are adducted.
6. The walls of the primary bronchi are supported by incomplete rings of hyaline cartilage. In addition, complete rings of smooth muscle develop between the mucosa of the airways and the cartilaginous support in the wall. Bronchioles have a simple columnar or simple cuboidal epithelium, no cartilage in their walls, thicker smooth muscle compared with that of large bronchi, and separation of groups of smooth muscle cells by connective tissue.
7. Terminal bronchioles are the last strictly conducting passageway in the respiratory system. They affect air resistance by either constricting or dilating. Respiratory bronchioles are the first respiratory portion of the respiratory system. They continue to have a conducting function, but they also have alveoli outpocketings in their walls where gas exchange occurs.
8. The hilum is a vertical opening in the mediastinal surface of the lung. Through this opening pass the bronchi, pulmonary vessels, lymphatic vessels, and nerves. Collectively, all structures passing through the hilum are termed the "root of the lung."
9. The diaphragm contracts during inhalation, causing a vertical dimensional change to the thorax. The external intercostals elevate the ribs in general, while the scalenes elevate the first and second ribs, causing lateral dimensional changes. Finally, a slight anterior-posterior dimensional change to the thoracic cavity occurs due to anterior movement of the inferior portion of the sternum during inhalation.
10. Pulmonary ventilation refers to the movement of air into and out of the respiratory tract, and is also known as breathing.
11. The main function of sympathetic innervation is bronchodilation (increase in the airway diameter of the bronchioles).

12. The dorsal respiratory group (DRG) is the inspiratory center. The ventral respiratory group (VRG) is the expiratory center. During normal, quiet breathing, the DRG is activated. The VRG, however, functions only during forced exhalation. During normal quiet breathing, the VRG is inactive, and exhalation is a passive event that does not require nervous stimulation.
13. Due to aging, in the amount of gas that can be exchanged with each breath and the ventilation rate both decrease. In some conditions, such as emphysema, there are fewer alveoli, which causes a reduced capacity for gas exchange. Additionally, a lifetime of carbon, dust, and pollution accumulation causes some of the lymph nodes in the lungs to turn black, resulting in a speckled appearance to the lungs, even in nonsmokers. Some alveolar epithelial cells die and are replaced by connective tissue, thus further reducing the lungs' capacity for gas exchange.