

Chapter 16 - Respiratory System

Respiration:

The respiratory system consists of tubes that _____ incoming air and _____ it into the microscopic alveoli where gases are _____.

What are the four processes of respiration?

Respiratory organs:

The organs of the respiratory tract can be divided into two groups: the upper respiratory tract (nose, nasal cavity, sinuses, and pharynx), and the lower respiratory tract (larynx, trachea, bronchial tree, and lungs).

Nose: The nose, supported by _____ and cartilage, provides an entrance for air in which air is filtered by coarse _____ inside the nostrils.

Nasal cavity: The nasal cavity is a space posterior to the nose that is divided medially by the _____.

Nasal conchae: What are they? What is their function?

Cilia: Particles trapped in the mucus are pushed to the _____ by ciliary action, swallowed, and carried to the _____ where gastric juice destroys any microorganisms in the mucus.

Paranasal sinuses: What four bones are they found in? What is their function?

Pharynx:

The pharynx is a common passageway for _____ and _____ and it aids in producing sounds for _____.

Larynx:

The larynx is an enlargement in the airway superior to the _____ and inferior to the _____.

It helps keep particles from entering the trachea and also houses the vocal cords.

The larynx is composed of a framework of _____ and _____ bound by elastic tissue.

What is the largest cartilage called? (Hint it is known as the Adam's apple.)

Inside the larynx, two pairs of folds of muscle and connective tissue covered with mucous membrane make up the _____. What is the upper pair called? What is their function?

What is the lower pair called? Their function?

What is the triangular slit called where air passes through? What closes this space off when swallowing?

Trachea:

The trachea extends downward anterior to the _____ and into the thoracic cavity, where it splits into right and left _____.

What is the inner wall lined with? Why?

The tracheal wall is supported by 20 incomplete cartilaginous rings. Why are they incomplete and not complete?

Bronchial tree:

The bronchial tree consists of branched tubes leading from the _____ to the _____.

The bronchial tree begins with the two primary _____, each leading to a lung. Where do these lead? How many are on each side?

What are the smallest branches of the bronchial tree called? Do they have cartilage in their walls?

Where does the actual gas exchange take place?

Lungs:

The right and left soft, spongy, cone-shaped lungs are separated medially by the _____ and are enclosed by the _____ and thoracic cage. The bronchus and large blood vessels enter each lung.

A layer of serous membrane, the visceral _____, attached to the lung, folds back to form the _____. The _____ pleura lines the thoracic cavity; Serous fluid lubricates the “pleura cavity” between these two membranes.

Each lobe is composed of lobules that contain air passages, alveoli, nerves, blood vessels, lymphatic vessels, and connective tissues.

BREATHING:

_____ (breathing), the movement of air in and out of the lungs, is composed of 2 processes: _____ and _____.

Inspiration: _____ pressure is the force that moves air into the lungs.

What happens when pressure on the inside of the lungs decreases?

Air pressure inside the lungs is decreased by _____ the size of the thoracic cavity; due to surface tension between the two layers of pleura, the lungs follow with the chest wall and _____.

What are the muscles involved in expanding the thoracic cavity? What keeps the alveoli from sticking to each other?

Expiration: The forces of expiration are due to the elastic _____ of lung and muscle tissues and from the surface tension within the alveoli.

Forced expiration is aided by _____ and abdominal wall muscles that compress the abdomen against the diaphragm.

Respiratory Volumes:

The measurement of different air volumes is called _____ and it describes four distinct respiratory volumes.

Define each of the following volumes and capacities.

- tidal volume: (TV)
- inspiratory reserve volume: (IRV)
- expiratory reserve volume: (ERV)
- residual volume: (RV)

Respiratory capacities:

- vital capacity (VC):
- inspiratory capacity:
- functional residual capacity:
- total lung capacity: (TLC)

Anatomical dead space: never gets to lungs

Respiratory control: Normal breathing is a rhythmic, involuntary act even though the muscles are under _____ control.

The respiratory center in _____ and _____ sends impulses to control respiration, controlled primarily by levels of _____ in blood. Levels of _____ play only a minor role, (only when levels are extremely low).

List three factors that affect breathing.

An inflation reflex, triggered by stretch receptors in the visceral pleura, bronchioles, and alveoli, helps to prevent _____ of the lungs during forceful breathing.

Hyperventilation lowers the amount of _____ in the blood.

Gas Exchange:

The _____ are the only sites of gas exchange between the atmosphere and the blood. They are tiny sacs clustered at the distal ends of the _____ ducts.

The _____ membrane consists of the epithelial cells of the alveolus, the endothelial cells of the capillary, and the two fused basement membranes of these layers.

Gases diffuse from areas of _____ pressure to areas of _____ pressure.

In a mixture of gases, each gas accounts for a portion of the total pressure; the amount of pressure each gas exerts is equal to its partial pressure. When the partial pressure of oxygen is higher in the alveolar air than it is in the capillary blood, oxygen will diffuse into the _____. When the partial pressure of carbon dioxide is greater in the blood than in the alveolar air, carbon dioxide will diffuse out of the _____ and into the _____.

What factors favor increased diffusion?

O₂ transport:

Over 98% of oxygen is carried in the blood bound to _____ of red blood cells, producing _____. This chemical is unstable in areas where the concentration of oxygen is low, and gives up its oxygen molecules in those areas.

More oxygen is released as the blood concentration of carbon dioxide increases, as the blood becomes more acidic, and as blood temperature increases.

A deficiency of oxygen reaching the tissues is called _____ and has a variety of causes.

CO₂ transport:

Carbon dioxide may be transported _____ in blood plasma, as _____, or as _____ ions. Which is most common?

When carbon dioxide reacts with water in the plasma, _____ acid is formed slowly, but instead much of the carbon dioxide enters red blood cells, where the enzyme _____ speeds this reaction.

The resulting acid dissociates immediately, releasing bicarbonate and hydrogen ions.