

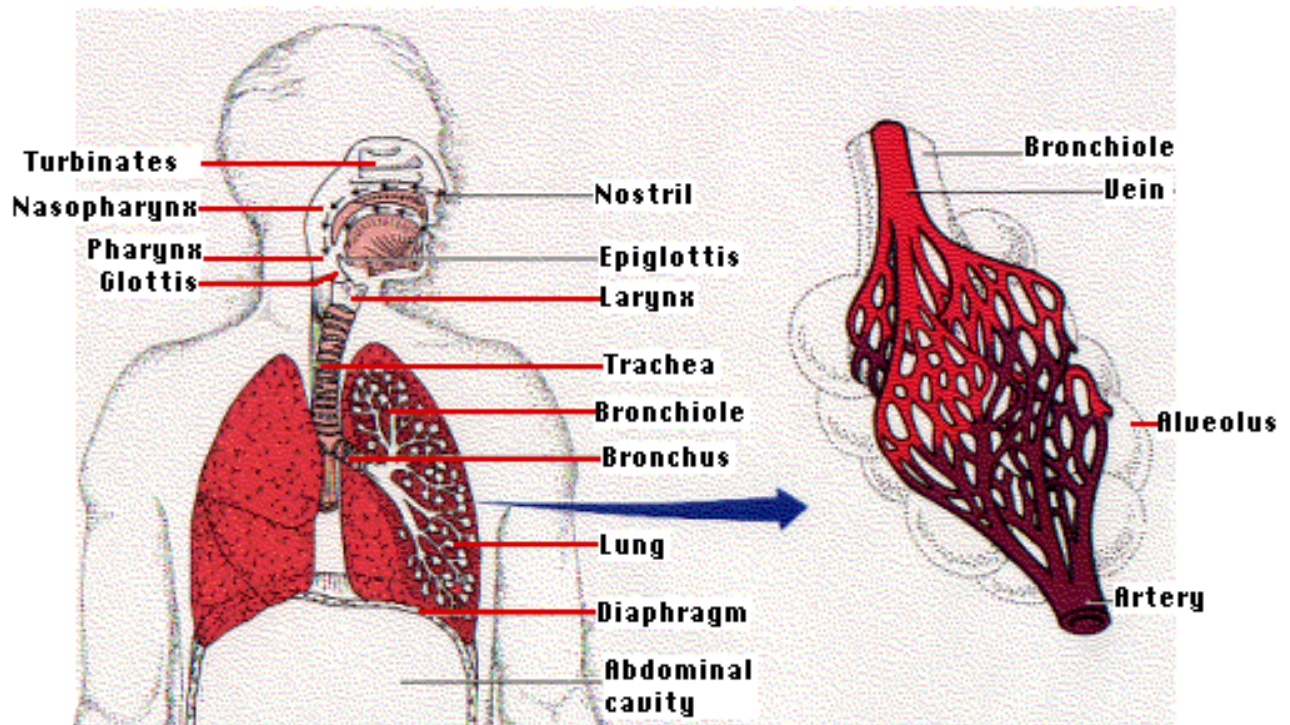
Human Respiration

Breathing:

Breathing is defined as the movement of air into and out of the lungs. This process is accomplished by the muscles of the rib cage and the diaphragm, a large muscle at the base of the chest cavity. The lungs, which are passive in the process of breathing, are sealed in two sacs, called the pleural membranes.

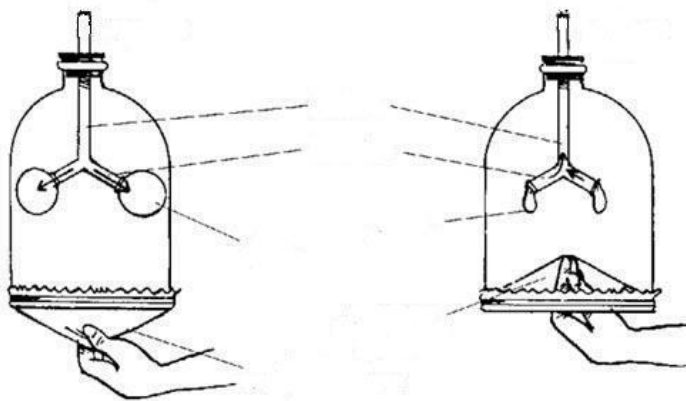
Parts of the Respiratory System:

Structure	Function
Nasal Cavity	(humidifier) warms, moistens & cleans the air Cilia and mucous trap potentially harmful substances
Pharynx	(throat) air passes through here after the nasal cavity
Larynx	(voice box) vocal cords are located here Air vibrates vocal cords to produce sound
Trachea	(windpipe) ringed with cartilage to keep the tube open Lined with cilia and mucous to trap potentially harmful substances
Bronchi	(one in each lung) cartilage-ringed tubes that branch off trachea Lined with cilia and mucous to trap potentially harmful substances
Bronchioles	Small branches off of the bronchi that end in alveoli
Alveoli	Small sacs at end of bronchioles Thin Moist Site of diffusion of oxygen and carbon dioxide (gas exchange)



Inhalation vs. Exhalation:

	INHALATION	EXHALATION
DIAPHRAGM	DROPS DOWN	PUSHES UP
RIB CAGE	LIFTS UP AND OUT	MOVES DOWN AND IN
AIR	RUSHES IN	FORCED OUT



IN HALATION

EXHALATION

Your lungs and smoking:

Tobacco contains three dangerous substances-

Nicotine- alkaloid, considered a poison, affects CNS (dopamine, possibly related to sense of euphoria, relaxation and addiction)

Increases heart rate, blood pressure, respiratory rate and BSL

Carbon monoxide- odorless, colorless gas that replaces oxygen

Tar- accumulates in lungs, causes alveoli to lose elasticity, can rot and stain teeth, contains majority of carcinogenic agents

Nicotine and carbon monoxide, inhaled when smoking tobacco, paralyze the cilia in the upper respiratory system.

- Without cilia, foreign particles tick to the mucus on the trachea or enter the lungs
- Without cilia, smoke-laden mucus is trapped along the airways, which can trigger the "smokers cough," the body's response to help clear the respiratory airways.
- These substances also cause the lining of the respiratory tract to swell, reducing air flow to the alveoli.

Diseases caused by smoking include:

- Chronic bronchitis:

Continuous inflammation of bronchi (can be caused by smoking)

Chronic obstructive pulmonary disease (COPD)

- Emphysema: alveoli lose elasticity due to tar, can rupture and gas exchange cannot occur as effectively

- Lung cancer:

Carcinogens in cigarette smoke can cause mutations in lung cells, leading to malignant tumors

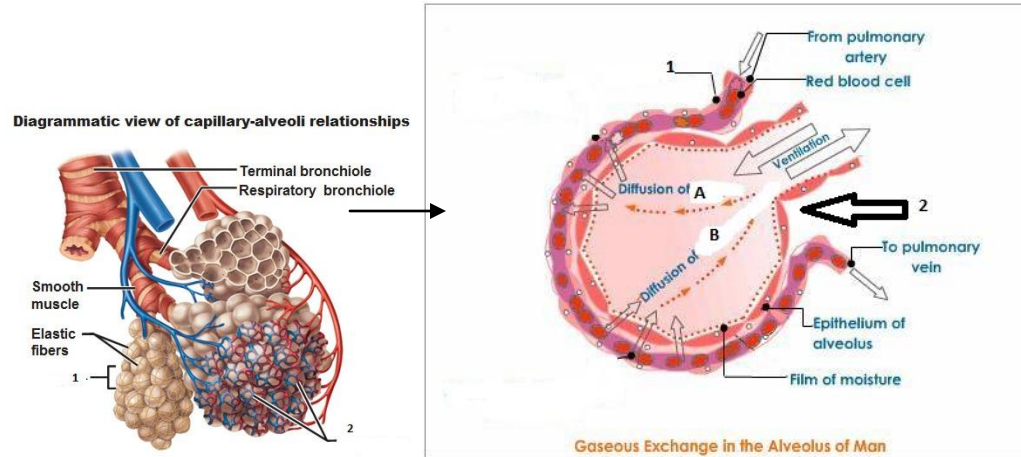
- Heart Disease:

Components of cigarette smoke can lead to hardening of the arteries and high blood pressure

Asthma, another respiratory disease, occurs as a result of an allergic reaction, and is characterized by a narrowing of the bronchial tubes and difficulty breathing.

Gas Exchange

Directions: Label the numbered parts in the spaces below.



1= alveoli 2= capillaries

Analysis:

1. What process occurs between the capillaries and the alveoli?

Diffusion/ gas exchange

2. What is gas A? Which direction is it diffusing?

A is oxygen diffusing from the alveoli in the lungs into the capillaries.

3. What is gas B? Which direction is it diffusing?

B is carbon dioxide diffusing from the capillaries into alveoli in the lungs to be exhaled.

4. What adaptation do the capillaries and alveoli share that allow for gas exchange?

Both of these structures are thin and moist, which are ideal conditions for gas exchange.

5. How does gas exchange help maintain homeostasis?

Gas exchange by diffusion at the alveoli allows oxygen to get to the cells of the body for respiration and eliminates the carbon dioxide these cells release as a waste of respiration, without the use of ATP.