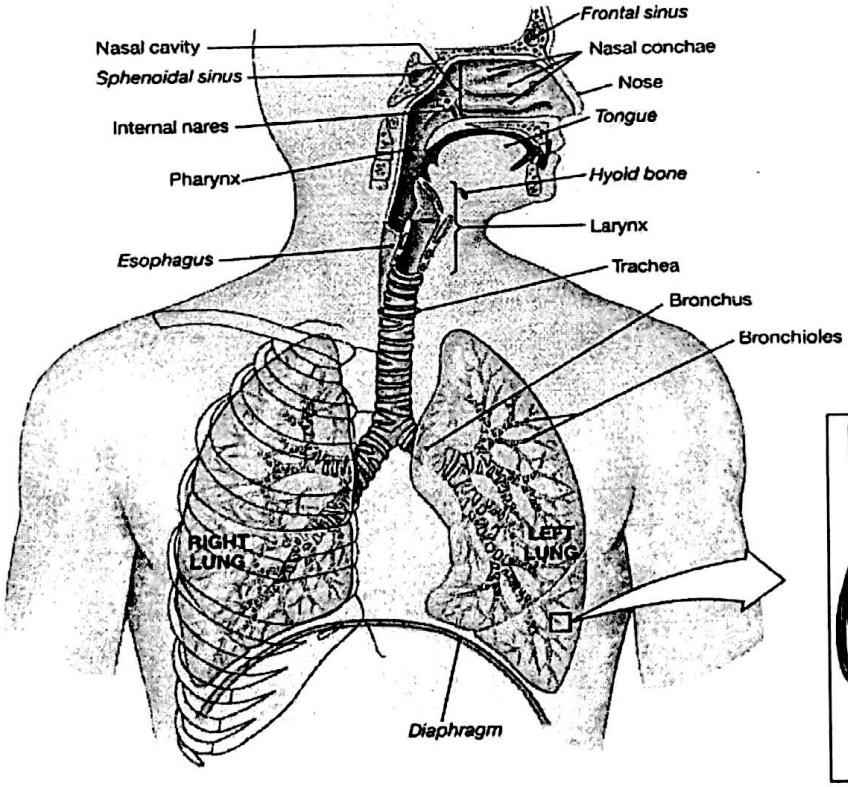
Respiratory System Consists of:

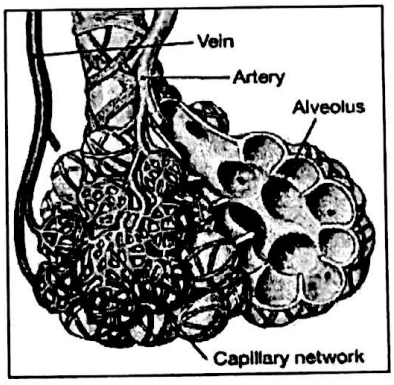
1-Conducting portion transports air.

- includes the nose, nasal cavity, pharynx, larynx, trachea, and progressively smaller airways, from the primary bronchi to the terminal bronchioles.

2-Respiratory portion carries out gas exchange.

- composed of small airways called respiratory bronchioles and alveolar ducts as well as air sacs called alveoli.





Respiratory System Functions:

1. supplies the body with oxygen and disposes of carbon dioxide
2. filters inspired air
3. produces sound
4. contains receptors for smell
5. rids the body of some excess water and heat
6. helps regulate blood pH

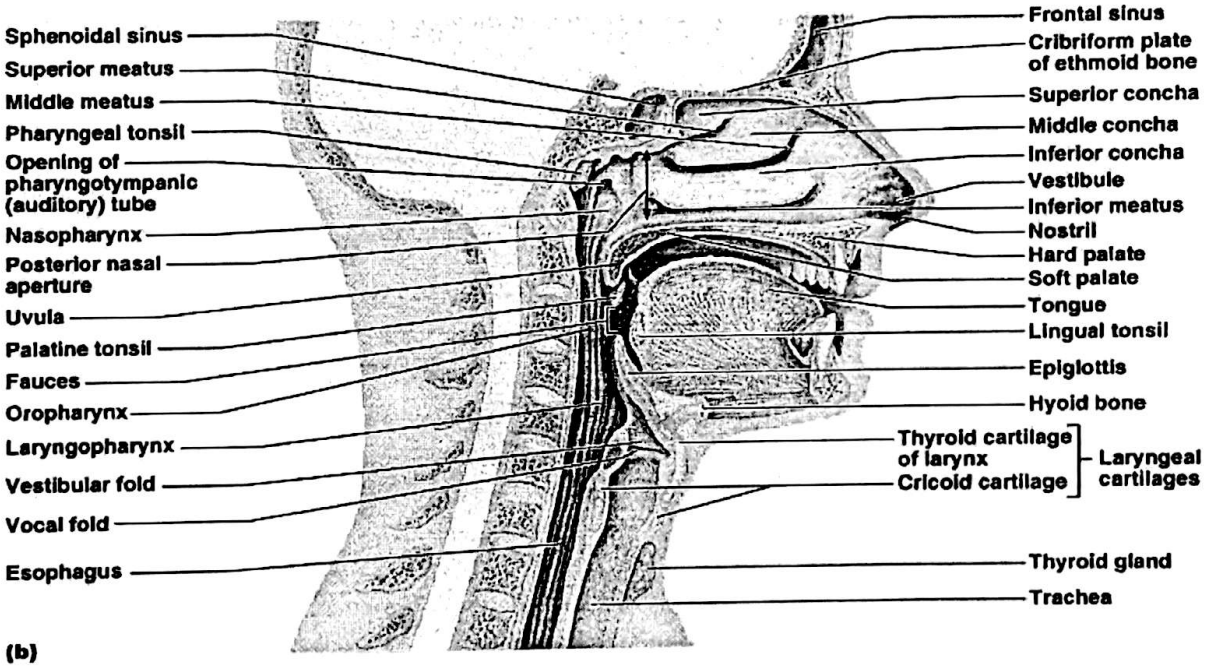
- Structure of the Nose:
  The nose is divided into two regions
- Anterior nares: external openings of nose, including the root, bridge, dorsum nasi, and apex.
- -Philtrum – a shallow vertical groove inferior to the apex
- Vestibule: area just inside the nasal cavity which contains vibrissae (hairs), glands
- Posterior nares: openings that allow air to pass from nasal cavity to pharynx are bounded laterally by the alae.
- Anterior nares→vestibule→inferior, middle, superior meati

(concha→posterior nares

- Function of the Nose:
  1. Providing an airway for respiration.
  2. Moistening (humidifying) and warming the entering air.
  3. Filtering inspired air and cleaning it of foreign matter.
  4. Serving as a resonating chamber for speech.
  5. Housing the olfactory receptors.

Nasal Cavity:

- Lies in and posterior to the external nose
- Is divided by a midline nasal septum
- Opens posteriorly into the nasal pharynx via internal nares
- The ethmoid and sphenoid bones from the roof
- The floor is formed by the hard and soft palates



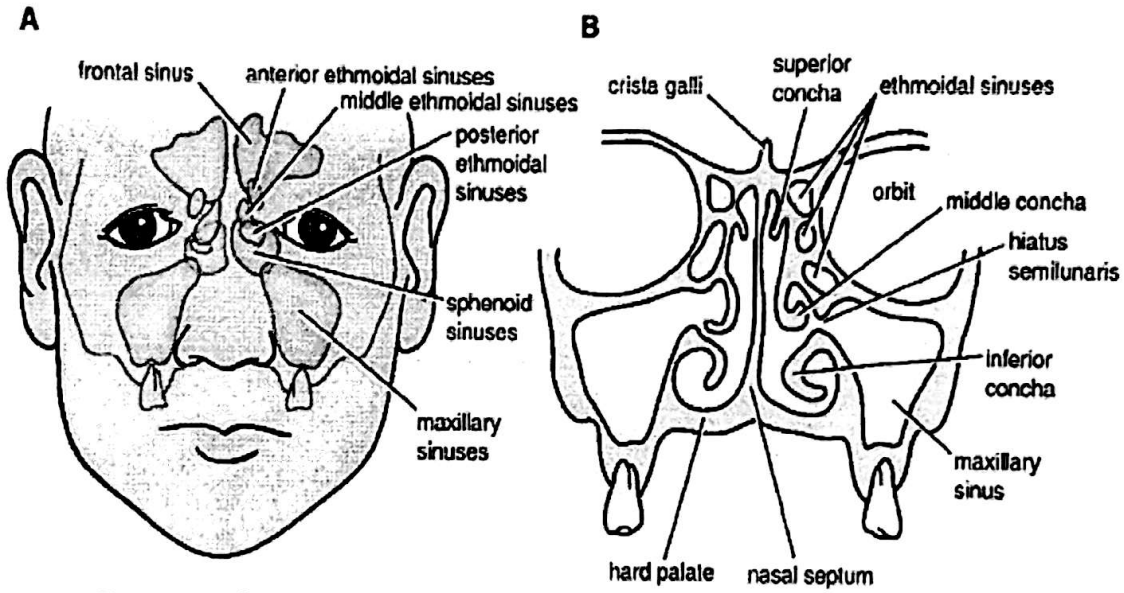
- Lateral Wall

The lateral wall has three projections of bone called the superior, middle, and inferior nasal conchae. The space below each concha is called a meatus.

The Paranasal Sinuses

The paranasal sinuses are cavities found in the interior of the maxilla, frontal, sphenoid, and ethmoid bones.

- Decrease skull bone weight
- Warm, moisten and filter incoming air
- Add resonance to voice.



- Communicate with the nasal cavity by ducts.

Pharynx

Funnel-shaped tube of skeletal muscle that connects to the:

-Nasal cavity and mouth superiorly

-Larynx and esophagus inferiorly

-Extends from the base of the skull to the level of the sixth cervical vertebra.

It is divided into three regions

-Nasopharynx

-Oropharynx

-Laryngopharynx

The Larynx

The larynx is an organ that provides a protective sphincter at the inlet of the air passages and is responsible for voice production. It is situated below the tongue and hyoid bone and between the great blood vessels of the neck and lies at the level of the fourth, fifth, and sixth cervical vertebrae. It opens above into the laryngeal part of the pharynx, and below is continuous with the trachea.

The framework of the larynx is formed of cartilages that are held together by ligaments and membranes, moved by muscles, and lined by mucous membrane.

The three functions of the larynx are:

*To provide a patent airway.

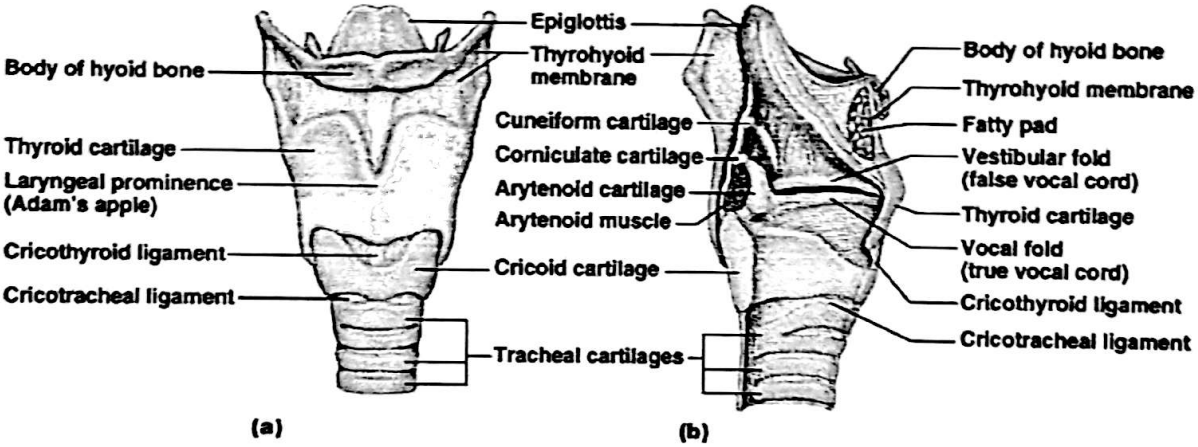
*Protects airway against entrance of solid or liquids.

*To function in voice production.

Cartilages of the Larynx

- Thyroid cartilage: This is the largest cartilage of the larynx and consists of two laminae of hyaline cartilage that meet in the midline in the prominent V angle (the so-called Adam's apple).
- Cricoid cartilage: This cartilage is formed of hyaline cartilage and shaped like a signet ring, having a broad plate behind and a shallow arch in front
- Arytenoid cartilages: There are two arytenoid cartilages, which are small and pyramid shaped and located at the back of the larynx

- Corniculate cartilages: Two small conical-shaped cartilages articulate with the arytenoid cartilages.
- Cuneiform cartilages: These two small rod-shaped cartilages.
- Epiglottis: This leaf-shaped lamina of elastic cartilage lies behind the root of the tongue.



Trachea

The trachea is a mobile cartilaginous and membranous tube. It begins in the neck as a continuation of the larynx at the lower border of the cricoid cartilage at the level of the sixth cervical vertebra. It descends in the midline of the neck. In the thorax the trachea ends below at the carina by dividing into right and left principal (main) bronchi at the level of the sternal angle (opposite the disc between the fourth and fifth thoracic vertebrae).

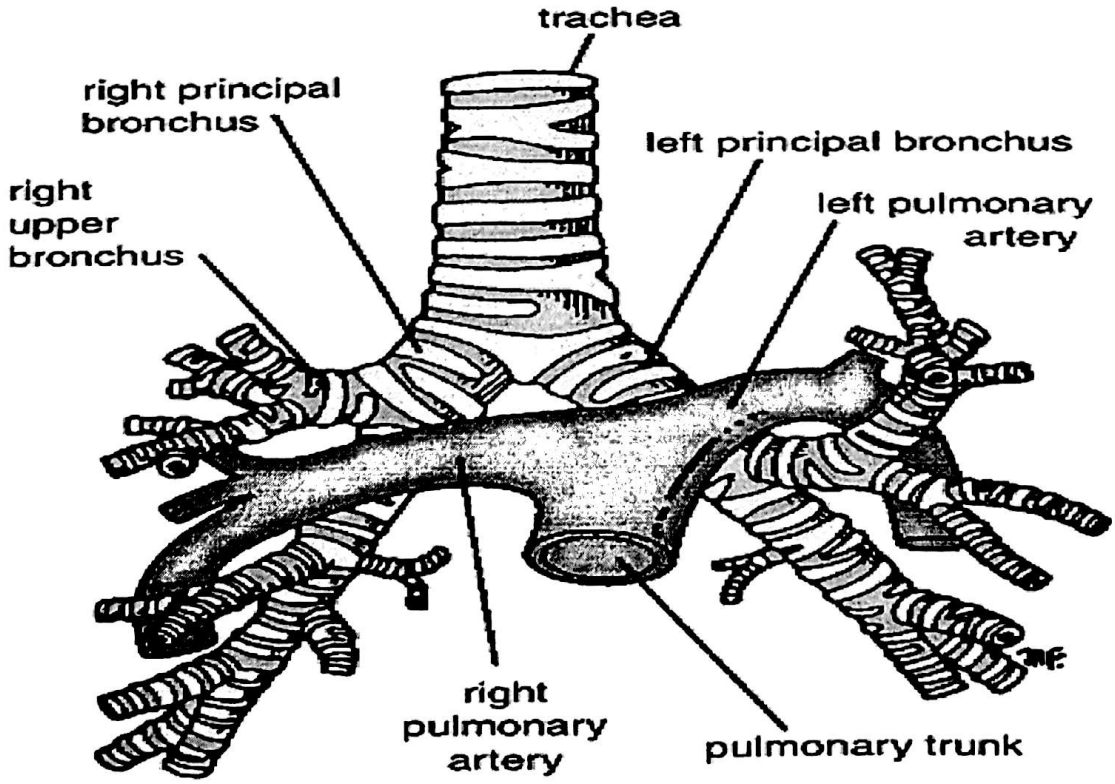
In adults the trachea is about (11.25 cm) long and (2.5 cm) in diameter. The fibroelastic tube is kept patent by the presence of U-shaped bars (rings) of hyaline cartilage embedded in its wall. The posterior free ends of the cartilage are connected by smooth muscle, the trachealis muscle.

The Bronchi

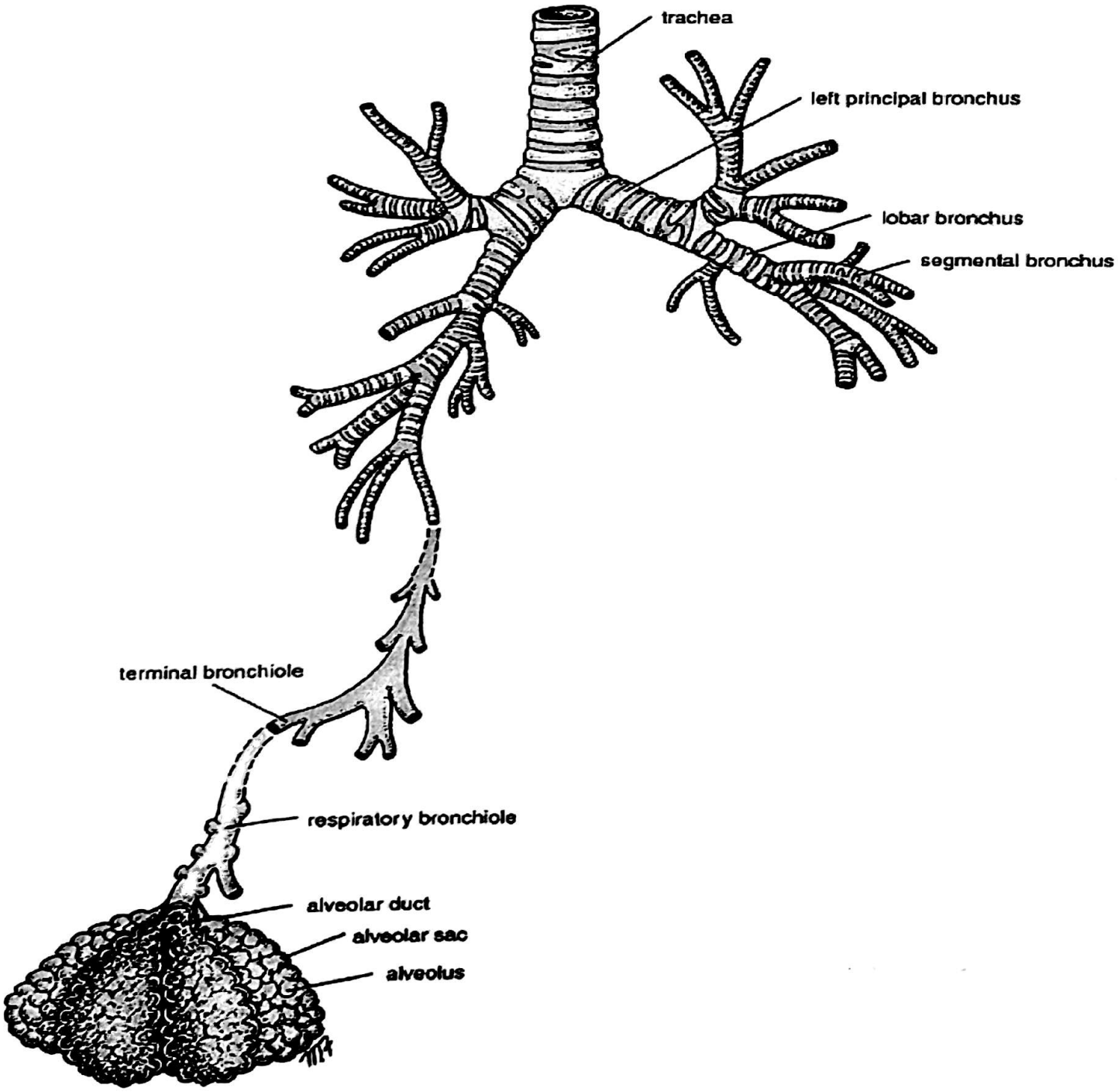
The trachea bifurcates behind the arch of the aorta into the right and left principal (primary, or main) bronchi. The bronchi divide dichotomously, giving rise to several million terminal bronchioles that terminate in one or more respiratory bronchioles. Each respiratory bronchiole divides into 2 to 11 alveolar ducts that enter the alveolar sacs. The alveoli arise from the walls of the sacs as diverticula.

Principal Bronchi

The right principal (main) bronchus is wider, shorter, and more vertical than the left and is about 1 in. (2.5 cm) long. Before entering the hilum of the right lung, the principal bronchus gives off the superior lobar bronchus. On entering the hilum, it divides into a middle and an inferior lobar bronchus.



The left principal (main) bronchus is narrower, longer, and more horizontal than the right and is about (5 cm) long. On entering the hilum of the left lung, the principal bronchus divides into a superior and an inferior lobar bronchus.



Lungs

- During life, the right and left lungs are soft and spongy and very elastic. If the thoracic cavity were opened, the lungs would immediately shrink to one third or less in volume. In the child, they are pink, but with age, they become dark and mottled because of the inhalation of dust particles that become trapped in the phagocytes of the lung. This is especially well seen in city dwellers and coal miners. The lungs are situated so that one lies on each side of the mediastinum, Extend from diaphragm to slightly above the clavicles & lie against ribs. They are therefore separated from each other by the heart and great vessels and other structures in the mediastinum. Each lung is conical, covered with visceral pleura, and suspended free in its own pleural cavity, being attached to the mediastinum only by its root.

Each lung has a blunt apex, which projects upward into the neck for about (2.5 cm) above the clavicle; a concave base that sits on the diaphragm; a convex costal surface, which corresponds to the concave chest wall; and a concave mediastinal surface, which is molded to the pericardium and other mediastinal structures. At about the middle of this surface is the hilum, a depression in which the bronchi, vessels, and nerves that form the root enter and leave the lung.

The anterior border is thin and overlaps the heart; it is here on the left lung that the cardiac notch is found. The posterior border is thick and lies beside the vertebral column.

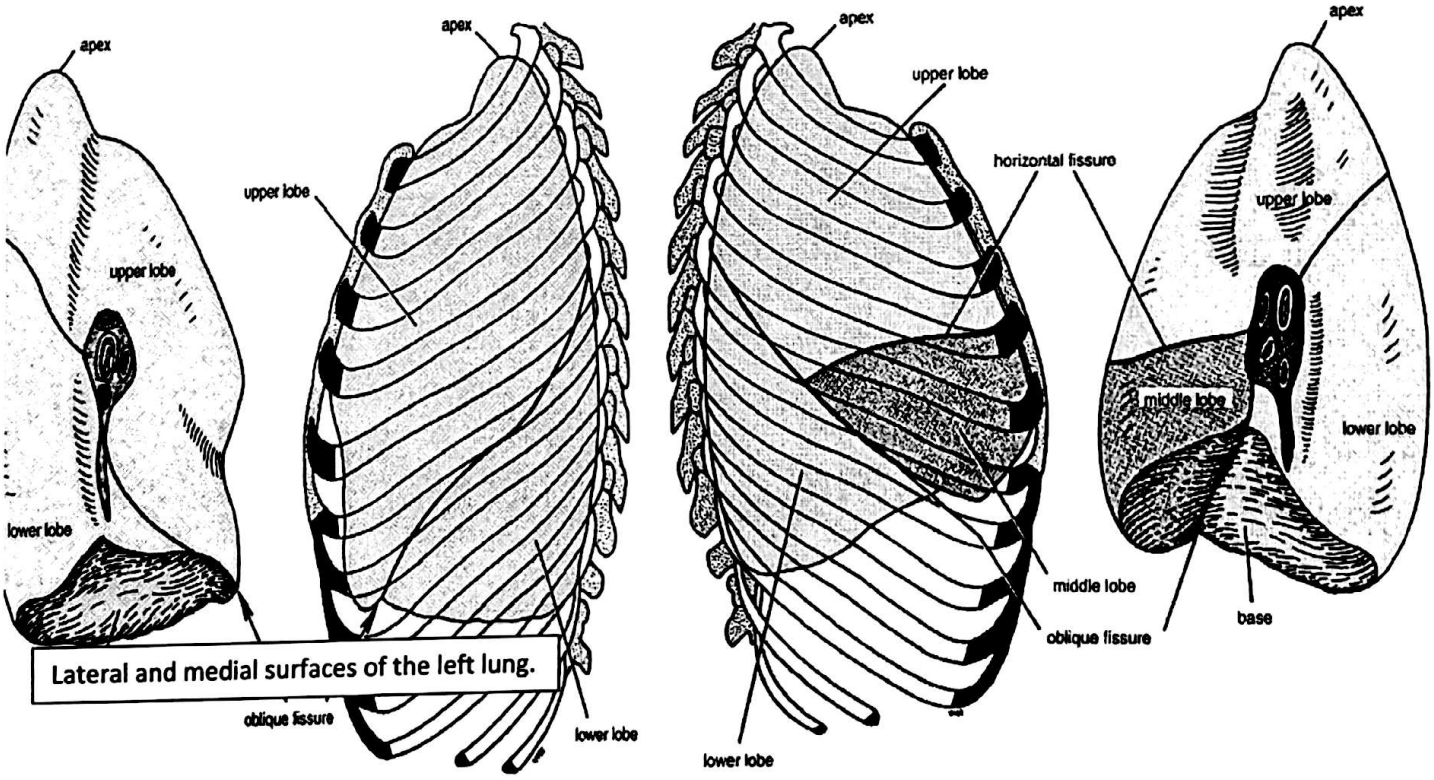
Lobes and Fissures

Right Lung

The right lung is slightly larger than the left and is divided by the oblique and horizontal fissures into three lobes: the upper, middle, and lower lobes.

Left Lung

The left lung is divided by a similar oblique fissure into two lobes: the upper and lower lobes. There is no horizontal fissure in the left lung.



Lateral and medial surfaces of the left lung.