

Al-Mustaqbal University College  
Anesthesia Technique Department

## Medical Physiology



Class: 1st  
Lec./8

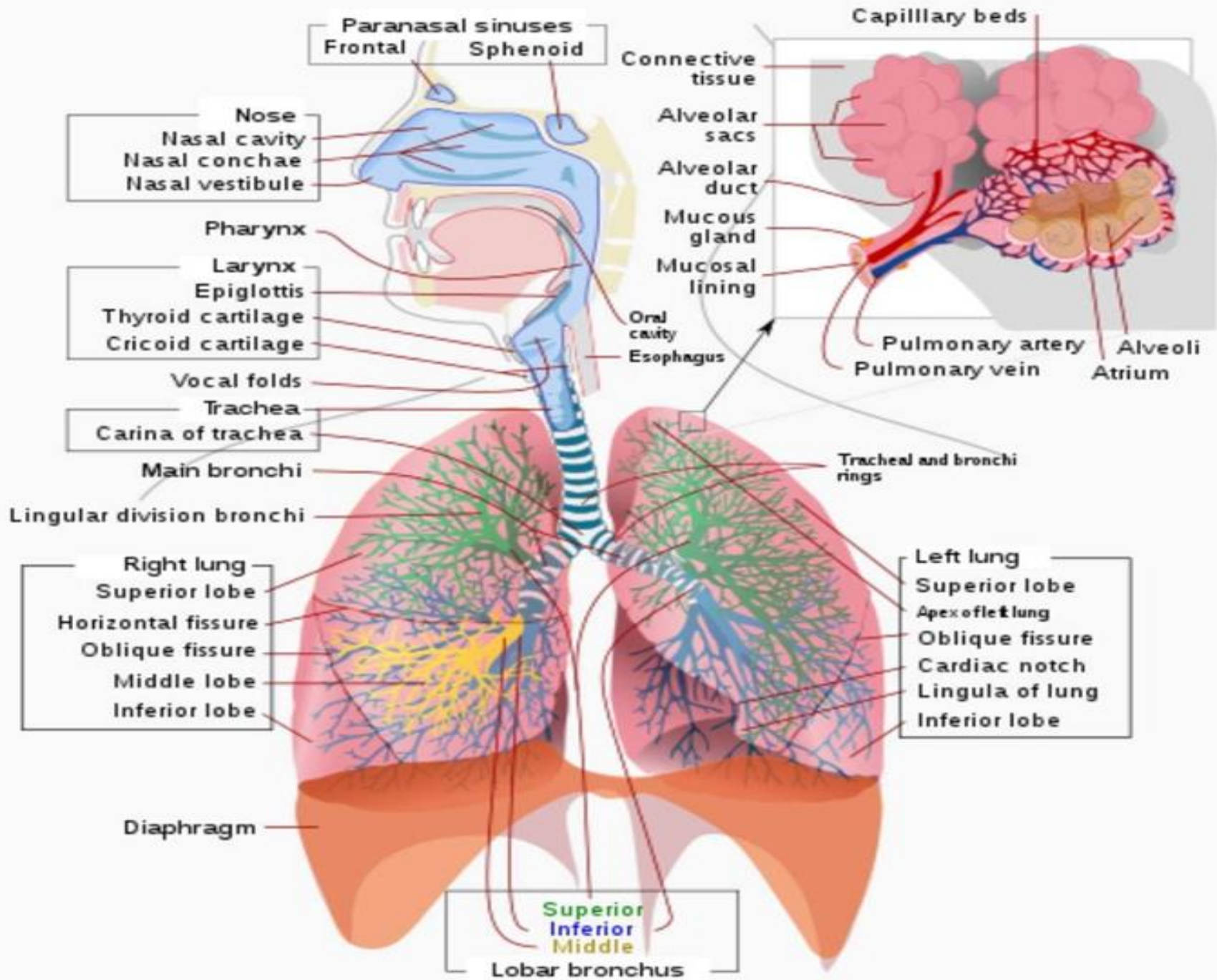
## Title Respiratory System

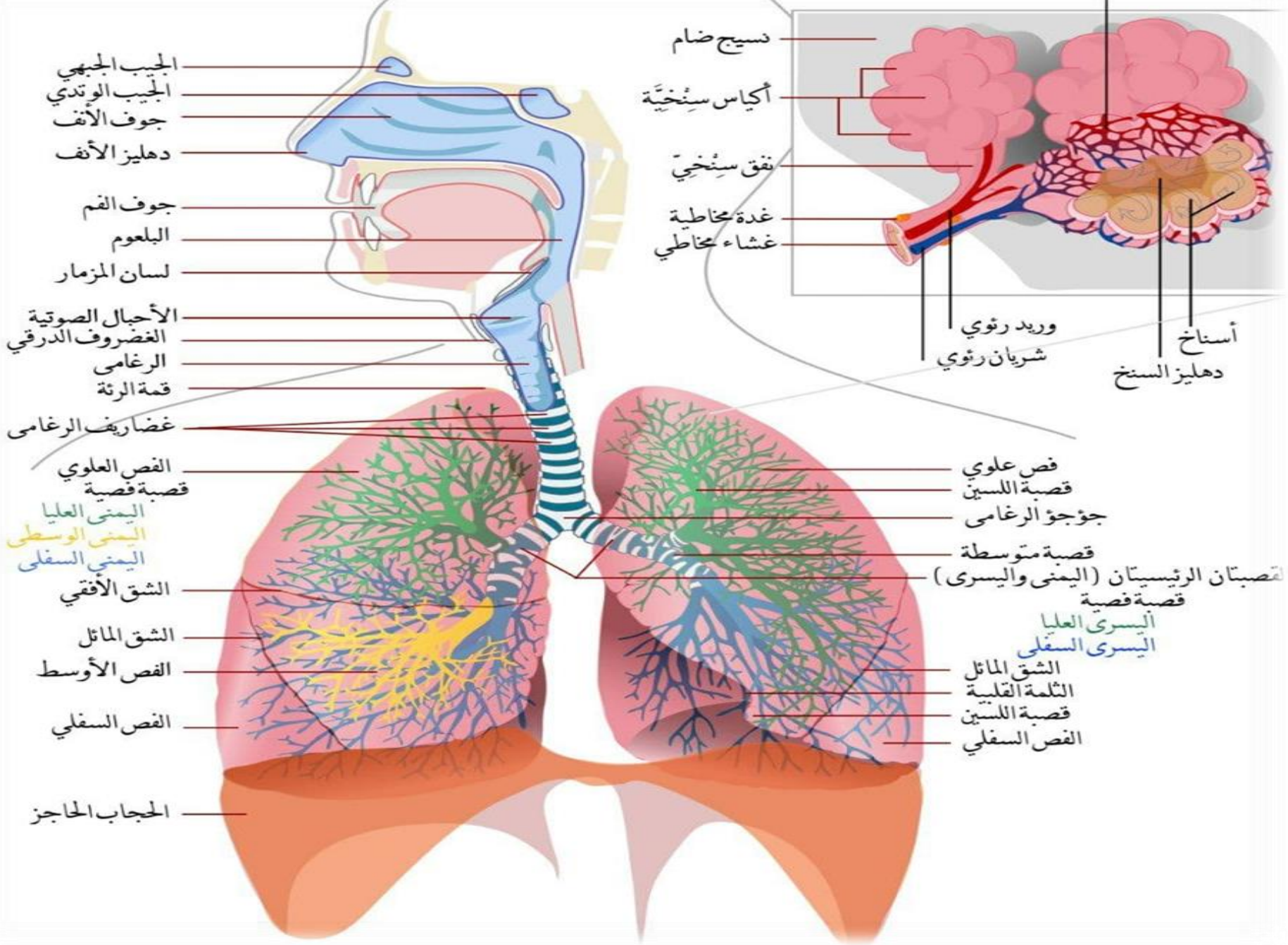
Prepared by  
Asst.lect Faten kareem

## Introduction

The respiratory system is one of the most important vital organs in the human body. Major organs of the respiratory system have primary function to provide oxygen to body tissues for cellular respiration, remove the waste product carbon dioxide, and help to maintain acid-base balance. Portions of the respiratory system are, also used for non vital functions such as sensing

An adult person breathes 12-16 breaths per minute, while the normal breathing rate for newborns is about 40 times per minute, and it may slow down to between 20-40 times while the child is asleep.





# **Part Of Respiratory System**

## **A. Conducting Zone**

The major functions of the conducting zone are to provide a route for incoming and outgoing air, remove debris and pathogens from the incoming air, and warm and humidify the incoming air

1. Noes 2- Pharynx 3-larynx 4- Trachea.

5- Bronchial tree (or respiratory tree) 6- Bronchiole.

## **A. Respiratory Zone**

The respiratory zone includes structures that are directly involved in gas exchange. The respiratory zone begins where the terminal bronchioles join a respiratory bronchiole, the smallest type of bronchiole, which then leads to an alveolar duct, opening into a cluster of alveoli.



# Alveoli:

- a) Alveolar duct.
- B) Alveolus
- c) Alveolar sac

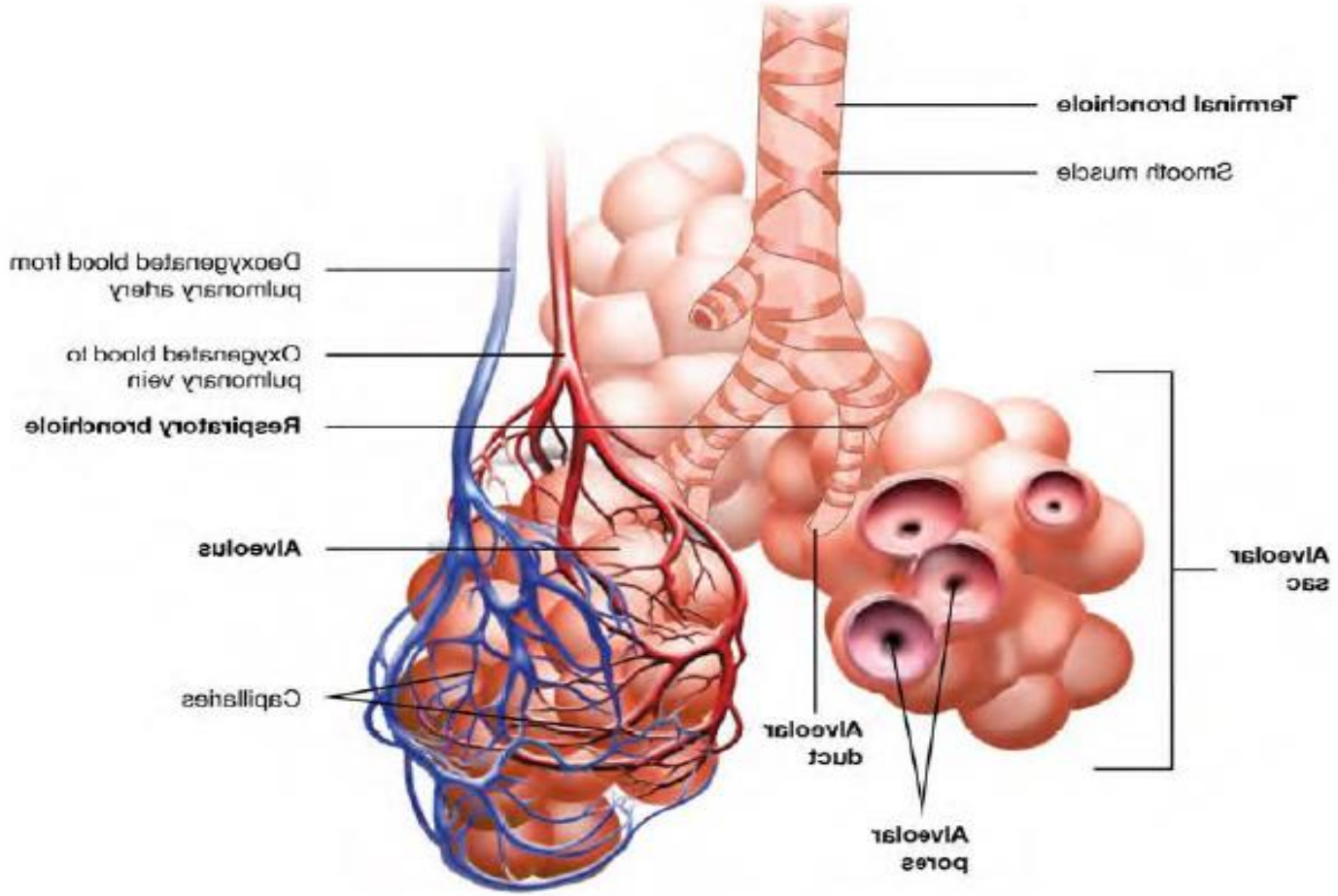


Figure 22.10 Respiratory Zone  
Bronchioles lead to alveolar sacs in the respiratory zone where gas exchange

# The Alveoli Are Lined By Two Types Of Epithelial Cells.

1. Type I cells
2. Type II cells

Type I cells:

Are flat cells with large cytoplasmic extensions and are the primary lining cells of the alveoli, covering approximately 95% of the alveolar epithelial surface area.

## **Type II cells (Granular pneumocytes) :**

- Are thicker and contain numerous lamellar inclusion bodies. a primary function of these cells is to secrete surfactant; however, they are also important in alveolar repair as well as other cellular physiology.

Although these cells make up approximately 5% of the surface area, they represent approximately 60% of the epithelial cells in the alveoli.



The alveoli also contain other specialized cells, including pulmonary **alveolar macrophages** , **lymphocytes**, **plasma cells**, **neuroendocrine cells**, and **mast cells**. the mast cells contain heparin, various lipids, histamine, and various proteases that participate in allergic reactions.

**Surfactant** is a phospholipids and proteins that is in the fluid lining the alveolar epithelium. a primary function of surfactant is to increase surface tension in the alveoli to keep them from deflating.

## **The Respiratory System Is Made Up Of :**

1. Gas-exchanging organ (the lungs).
2. "Pump" that ventilates the lungs. The pump consists of the chest wall; the respiratory muscles, which increase and decrease the size of the thoracic cavity.
3. The areas in the brain that control the muscles.
4. The nerves that connect the brain to the muscles.

## **Pulmonary Function**

- Respiration, as the term is generally used, includes two processes:
- External respiration, the absorption of O<sub>2</sub> and removal of CO<sub>2</sub> from the body as a whole.
- Internal respiration, the utilization of o<sub>2</sub> and production of co<sub>2</sub> by cells and the gaseous exchanges between the cells and their fluid medium.
- The composition of dry air is 20.98% o<sub>2</sub>, 0.04% co<sub>2</sub>, 78.06% N<sub>2</sub>, and 0.92% other inert constituents such as argon and helium.
- The barometric pressure (PB) at sea level is 760 mm hg (1 atmosphere).
- Gas diffuses from areas of high pressure to areas of low pressure, with the rate of diffusion depending on the concentration gradient and the nature of the barrier between the two areas.

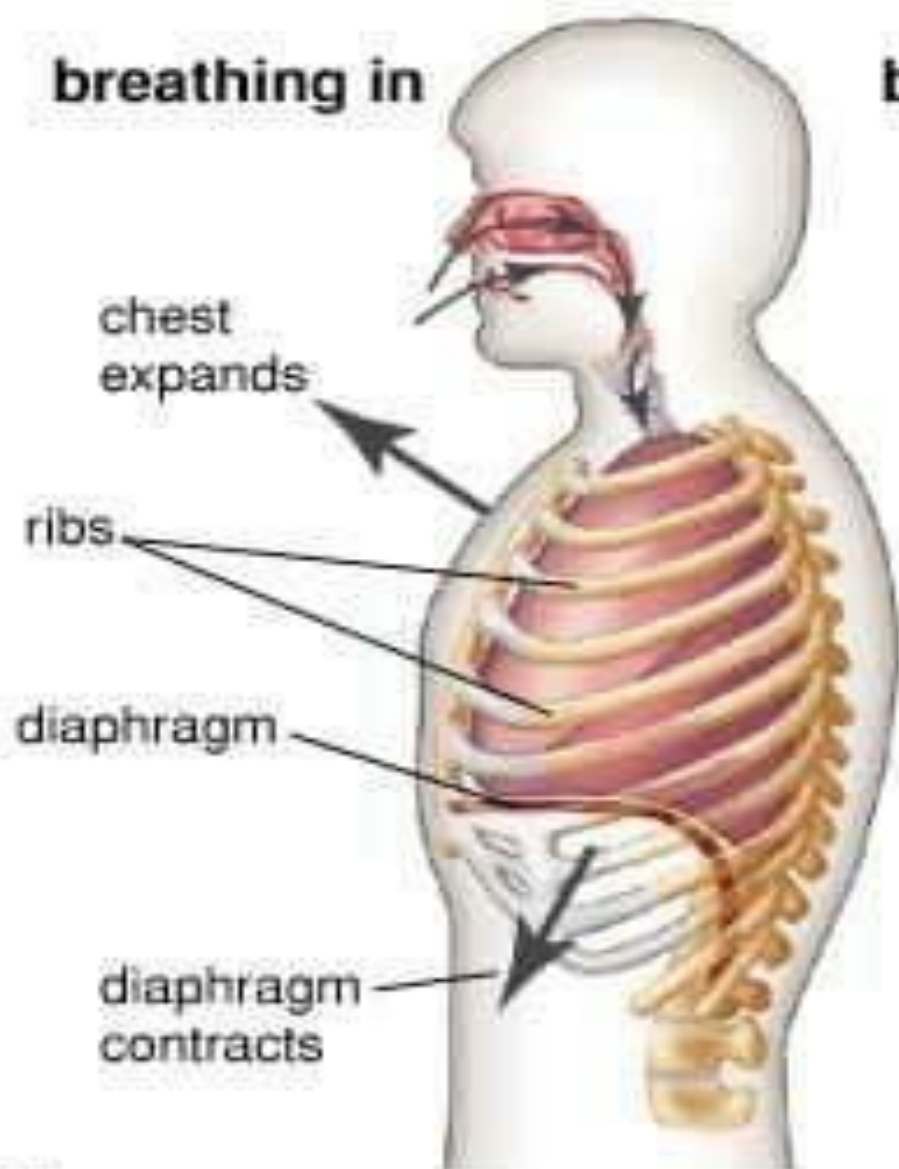
Respiratory movements are of two types:

- \* The inhalation process (introducing air into the lungs): The chest circumference is expanded during this process

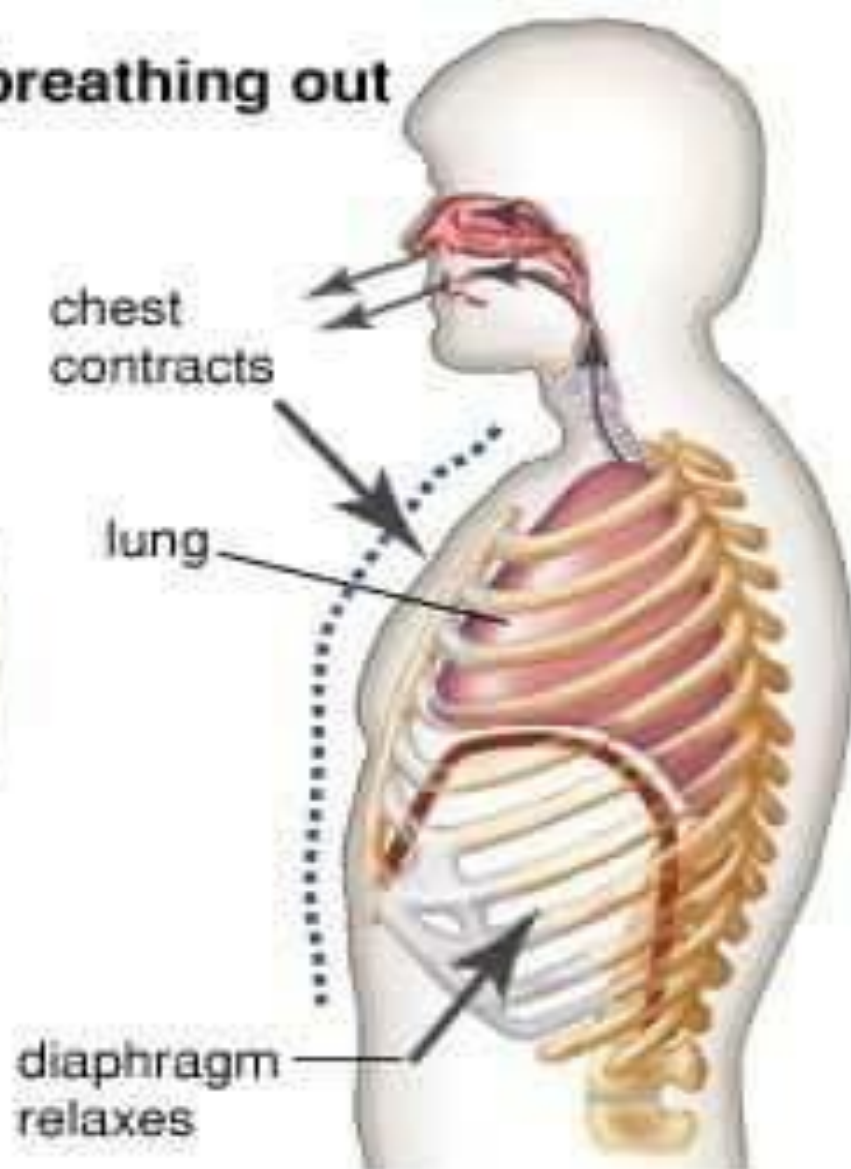
- \* Exhalation (expelling air from the lungs): The chest circumference is narrow during this process.

Breathing is through the mouth or nose. In both cases, air collects in the windpipe to pass into the lungs

**breathing in**



**breathing out**



Good Luck