

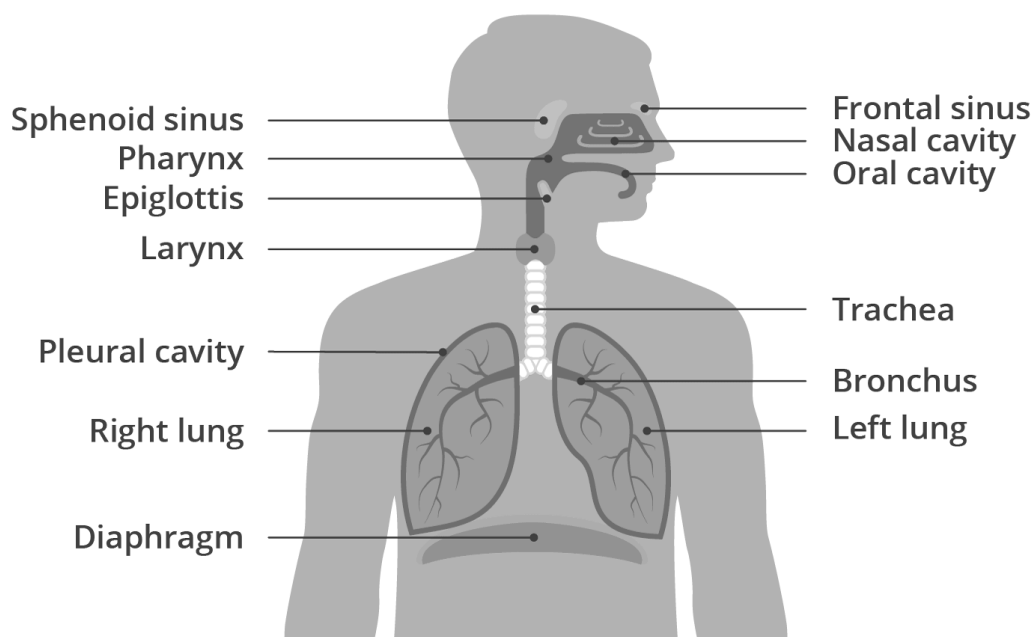
## Chapter– 3 Respiratory System

### Topic: Respiratory System

#### 3.1

#### Introduction

The respiratory system is a vital organ system responsible for the exchange of gases between the body and the external environment. Its primary function is to facilitate the intake of oxygen (O<sub>2</sub>) from the air and the removal of carbon dioxide (CO<sub>2</sub>) from the body.



#### 3.2

#### Respiratory system's components and functions

##### Respiratory system's components and functions:

- 1. Nose and Nasal Cavities:** The respiratory process begins with the inhalation of air through the nostrils. The nose contains hair and mucus membranes that help filter, warm, and humidify the air as it enters the body.
- 2. Pharynx (Throat):** The pharynx serves as a common passageway for both air and food. It directs air from the nasal cavities to the trachea and the esophagus to the stomach.
- 3. Larynx (Voice Box):** The larynx is located at the top of the trachea and houses the vocal cords, which play a crucial role in speech production. It also serves as a protective

mechanism by closing off the airway during swallowing to prevent food and liquids from entering the lungs.

4. **Trachea (Windpipe):** The trachea is a tube-like structure composed of cartilage rings that extends from the larynx to the bronchi. It conducts air to and from the lungs.
5. **Bronchi and Bronchioles:** The trachea branches into two primary bronchi, one leading to each lung. Inside the lungs, the bronchi further divide into smaller bronchioles, which eventually terminate in tiny air sacs called alveoli.
6. **Alveoli:** Alveoli are small, thin-walled air sacs located at the end of the bronchioles within the lungs. They are the site of gas exchange, where oxygen from the air diffuses into the bloodstream and carbon dioxide is released from the bloodstream into the air for exhalation.
7. **Lungs:** The lungs are paired organs located within the thoracic cavity (chest) on either side of the heart. They are soft, spongy structures composed of bronchi, bronchioles, alveoli, and blood vessels. The right lung has three lobes, while the left lung has two lobes to accommodate the space occupied by the heart.
8. **Diaphragm and Intercostal Muscles:** The diaphragm is a dome-shaped muscle located beneath the lungs that plays a central role in the breathing process. During inhalation, the diaphragm contracts and moves downward, increasing the volume of the thoracic cavity and drawing air into the lungs. Exhalation occurs when the diaphragm relaxes and moves upward, and the intercostal muscles between the ribs contract to decrease the thoracic cavity's volume, expelling air from the lungs.

The respiratory system works in coordination with the cardiovascular system to deliver oxygen to tissues and remove carbon dioxide from the body. It also plays a crucial role in regulating blood pH and maintaining homeostasis.