Respiratory System

- **Cellular Respiration**
  - It is the process in which food is broken down in the cell to release energy.
  - It occurs in the cells of all living organisms.

- **Two types of Respiration**
  - **Aerobic respiration** – It is the process of breakdown of food in the presence of oxygen.
  - It occurs in all organisms.
  - It leads to production of carbon dioxide, water, and energy.

$$\text{Glucose} \xrightarrow{\text{Oxygen}} CO_2 + \text{Water} + \text{Energy}$$

  - **Anaerobic respiration** – It is the process of breakdown of food in the absence of oxygen.
  - Yeast, bacteria, human muscle cells, etc. respire anaerobically.
  - In yeast cells, anaerobic respiration leads to production of alcohol and carbon dioxide.

$$\text{Glucose} \xrightarrow[\text{Oxygen}]{\text{without}} \text{Alcohol} + \text{Energy} + CO_2$$

  - During heavy exercise, our muscles respire anaerobically to provide energy to muscle cells. This leads to accumulation of lactic acid that causes muscle cramps and thus, pain in body.

$$\text{Glucose} \xrightarrow[\text{Oxygen}]{\text{without}} \text{Lactic acid}$$

Breathing and Exchange of Gases (Respiration)

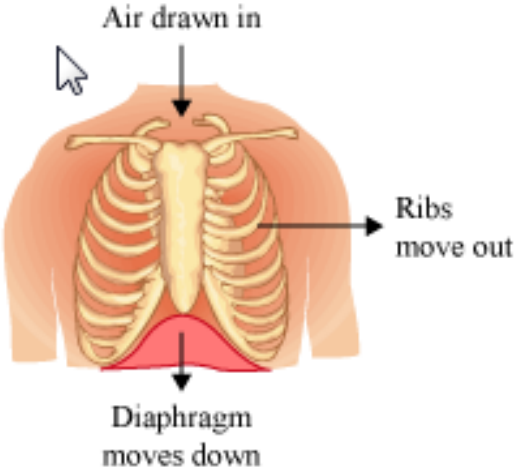
- Respiration is the process of release of energy from the breakdown of organic substances.

- It involves the exchange of oxygen from atmosphere and carbon dioxide produced in the body.

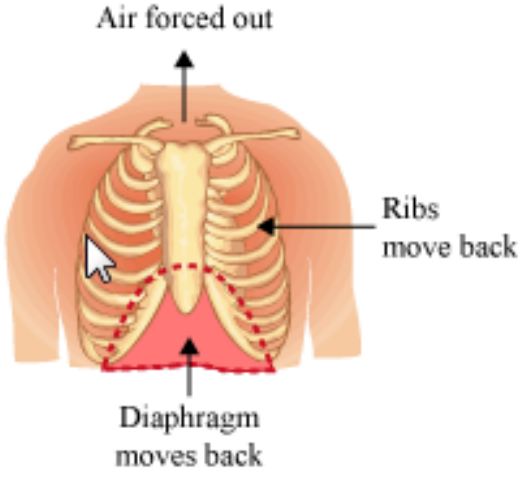
Human respiratory system includes nose, pharynx, trachea, bronchi, bronchioles and lungs.

The breathing involves two processes: Inhalation and exhalation.

During **inhalation**, the diaphragm moves down and the ribs move upwards and outwards, thereby increasing the space in the chest cavity. This leads to the movement of air inside the lungs.



During **exhalation**, the diaphragm moves to its former position and the ribs move downwards and inwards, thereby reducing the size of the chest cavity. This leads to the movement of air out of the lungs.



Exchange of oxygen and carbon dioxide is done through the blood surrounding the alveoli. Blood rich with oxygen reaches the various cells of our body and releases

oxygen in the cells, where it used for oxidation of glucose to provide energy for functioning of the cells. The by product of this process is carbon dioxide which is absorbed by the blood and carried back to the alveoli, and then it is exhaled out of the body.