# CLASS VII SCIENCE
# CHAPTER 10
# RESPIRATION IN ORGANISMS
# MODULE 1/2

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# INTRODUCTION:

All living organisms respire. Respiration is essential for survival of living organisms. It releases energy from the food. The oxygen we inhale is used to breakdown glucose into carbon dioxide and water. Energy is released in the process. Respiration is a process which involves breathing.

# Respiration in Animals

**Why do organisms respire?**

Organisms respire to get energy from food. During respiration energy is released from food and this takes place inside the cells of the body. Oxygen of air taken inside the cells is used for breaking down of food and energy is released by burning food.

**Respiration:-** It is the process by which food (glucose) is broken down in the cells of the body with the help of oxygen to release energy.
Since respiration takes place in the cells of the body, it is called cellular respiration.

# CELLULAR RESPIRATION

We breathe out air which is rich in carbon dioxide. The air we breathe in is transported to all parts of the **body** and ultimately to each cell. The process of breakdown of food in the cell with the release of energy is called cellular **respiration**. Cellular **respiration** takes place in the cells of all **organisms**.

**$C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$ + Energy**

**The release of energy during cellular respiration**


$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$$

# TYPES OF RESPIRATION :-

**There are two types of respiration i) aerobic respiration ii) anaerobic respiration.**

**i) Aerobic respiration - the process of respiration that takes place in the presence of oxygen in which glucose breaks into carbon dioxide and water with the release of energy. It takes place in most organisms.**

**Glucose --> carbon dioxide + water + energy.**

**ii) Anaerobic respiration - the process of respiration that takes place in the absence of oxygen in which glucose breaks into alcohol and carbon dioxide with release of energy. It takes place in yeast cells.**

**Glucose --> ethanol + carbon dioxide + energy.**

**In absence of oxygen in our muscle cells, Glucose breaks into lactic acid with the release of energy.**

**Glucose → lactic acid + energy.**

# MUSCLE CRAMPS AND RELIEF

**Muscle cramps occur when there is anaerobic respiration taking place in our muscles. During anaerobic respiration, glucose gets converted into lactic acid which leads to lack of oxygen**


**A hot water bath or a massage can help in getting relief from the muscle cramps. These two things improve blood circulation, thereby increasing the supply of oxygen to the muscles**

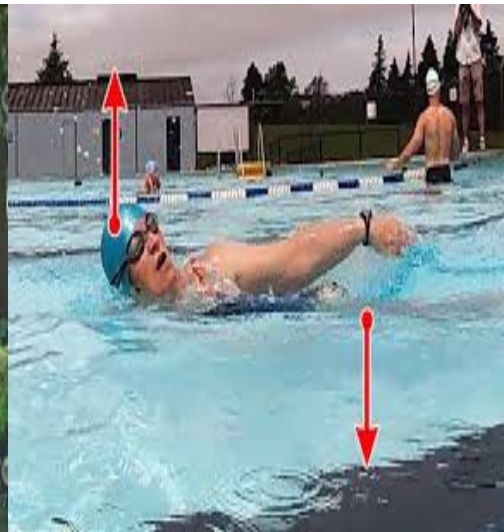
# DIFFERENCE BETWEEN AEROBIC AND ANAEROBIC RESPIRATION

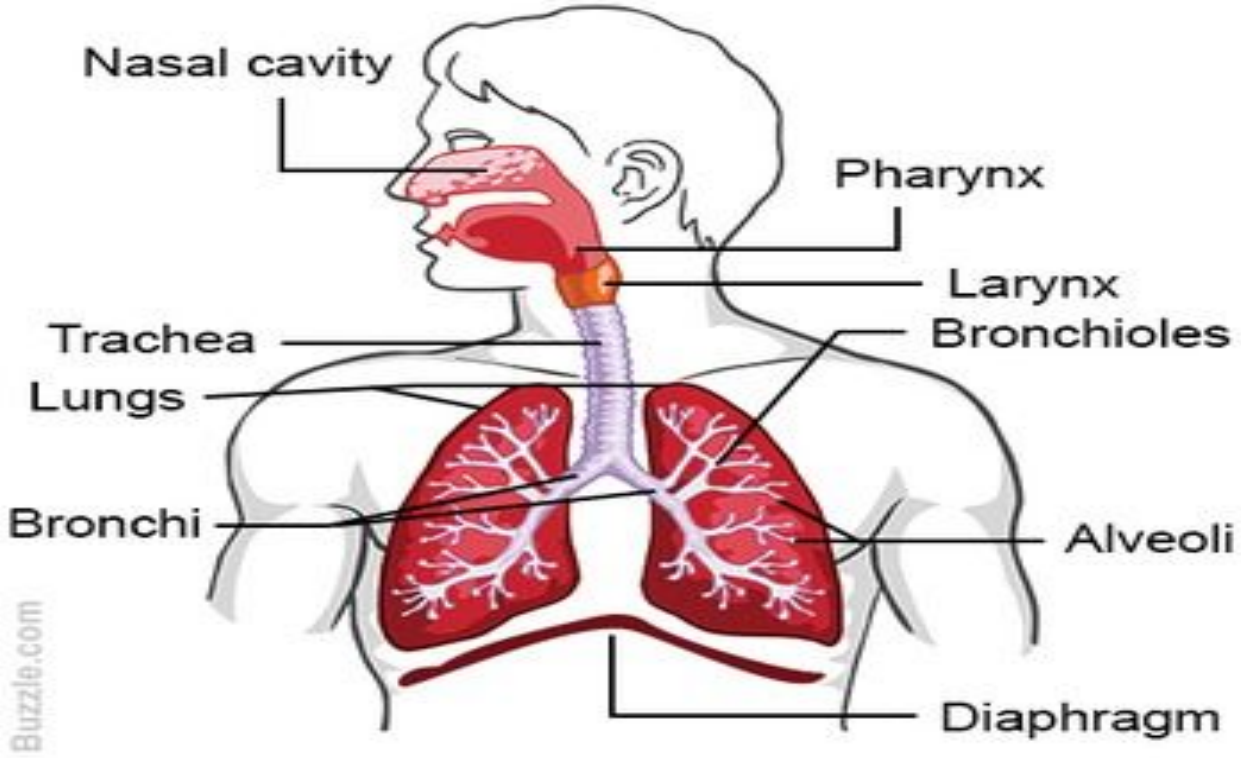
| S.No. | Aerobic Respiration | Anaerobic Respiration |
|---|---|---|
| 1. | Occurs in the presence of oxygen. | Occurs in the absence of oxygen. |
| 2. | Glucose is completely oxidised. | Glucose is broken down incompletely. |
| 3. | End products are carbon dioxide and water. | End products are either ethyl alcohol and carbon dioxide or lactic acid. |
| 4. | More energy is produced. | Very little energy is produced. |
| 5. | Occurs in most of the plants and animals. | Occurs in few organisms like yeast, some bacteria and some parasitic worms. |

**Breathing** is the process of moving air into and out of the lungs to facilitate gas exchange .The taking in of oxygen rich air is called **inhalation.** The giving out of carbondioxide rich air is called **exhalation**.

The **respiratory rate** in humans is measured by counting the number of breaths for one minute .

For humans, the typical respiratory rate for a healthy adult at rest is 12–18 breaths per minute. When a person needs more energy, he breathes faster and more oxygen is supplied to the cells, more food is broken down to get more energy.



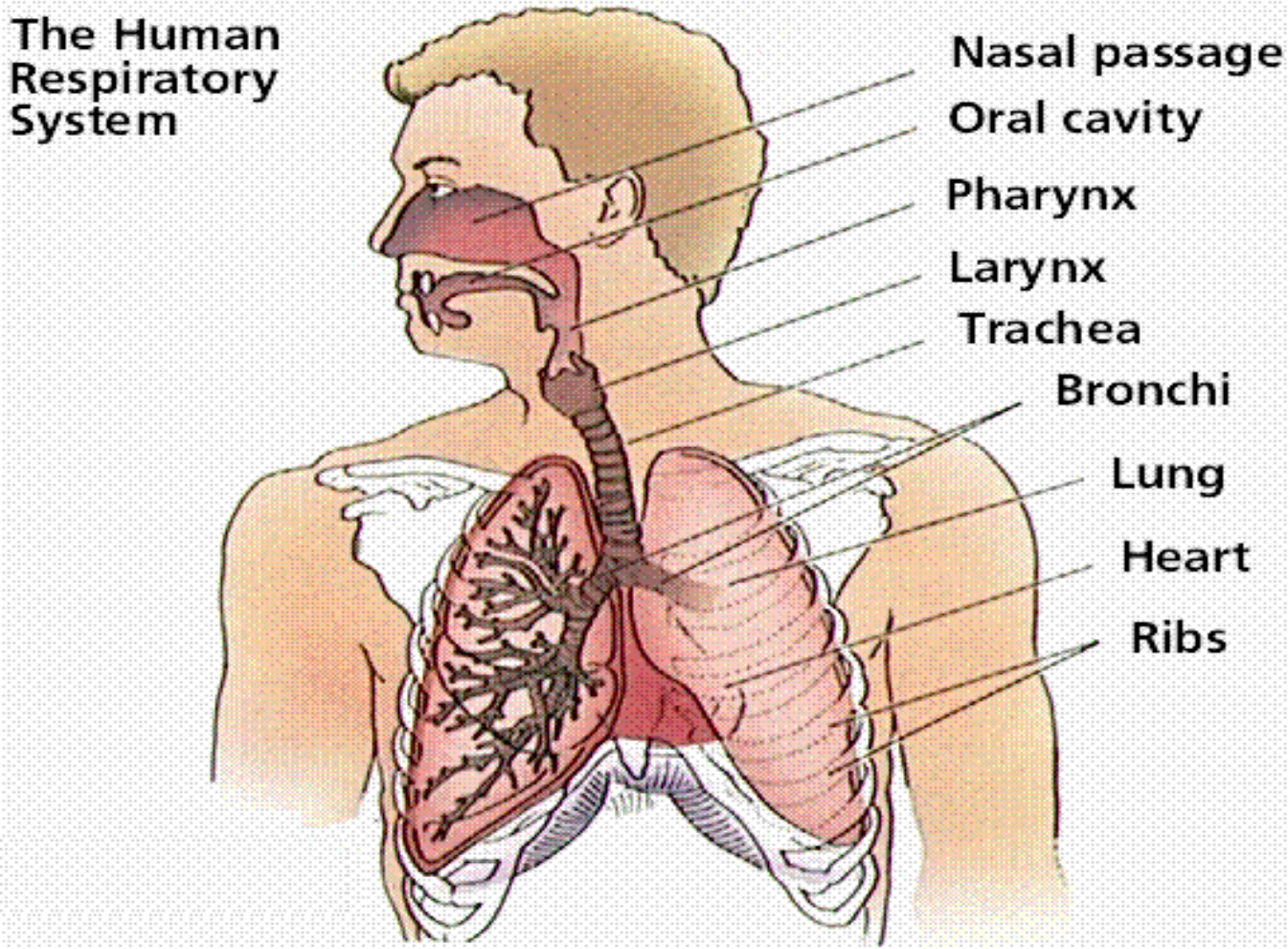



**What makes up the respiratory system?**

**Nose.**
**Mouth.**
**Throat (pharynx)**
**Voice box (larynx)**
**Windpipe (trachea)**
**Airways (bronchi)**
**Lungs.**

# THE PATHWAY OF BREATHING

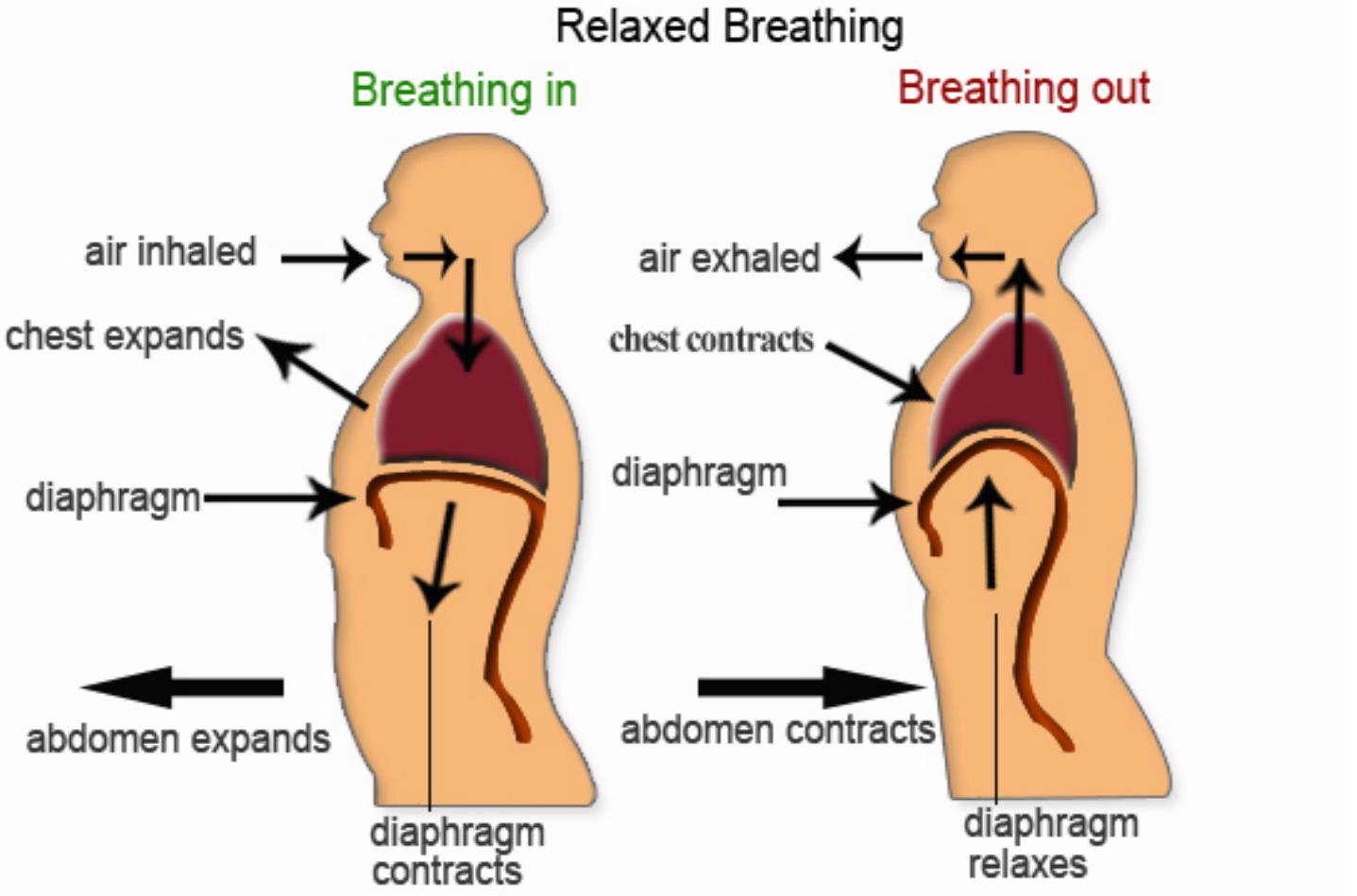
**External nostril** leads to→ **Nasal passage**→ leads to **Nasal chamber** → leads to **Nasopharynx** → leads to **larynx** → **Trachea**→divides → **Bronchi**→ divides → **Primary bronchiole**→ divides → **secondary to tertiary bronchioles** → divides → **terminal bronchioles** → divides → **Alveoli**.



# HOW DO WE BREATHE?

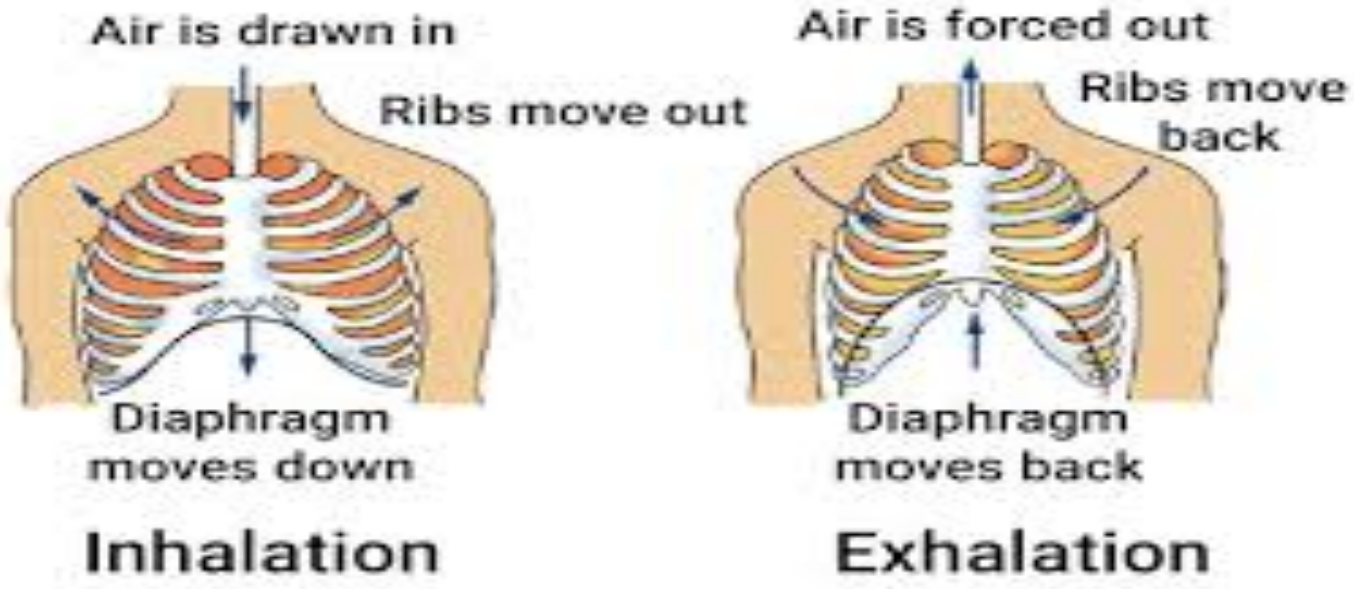
**Breathing involves the rib cage and a muscular sheet below the chest cavity called diaphragm.**

**During inhalation chest cavity increases in size and the diaphragm moves down and air enters into the lungs. During the exhalation the chest cavity reduces in size and the diaphragm moves up and air is pushed out of the lungs.**



# MECHANISM OF BREATHING

**Inhalation** is the process of taking in air containing oxygen, while **exhalation** is the process of giving out rich containing carbon dioxide. This is the basic process of breathing. Here one breath involves the one complete inhalation and exhalation.



# WHAT CAUSES SNEEZING?

**Sneezing** is **caused** by irritation to the mucous membranes of the nose or throat


**We often sneeze when we inhale a lot of dust-laden air to expel out these foreign particles. These particles get past the hair in the nasal cavity and irritate the lining of the cavity which triggers a message to the brain. The brain instructs the nasal chamber to initiate sneezing.**

# BREATHING AND RESPIRATION

## Respiration and breathing

| Respiration | Breathing |
|---|---|
| Takes place all the time | Takes place all the time |
| Take place in every cell | Take place in the lungs |
| A process that breaks down food to release energy | A process of gaseous exchange with the environment |
| Uses oxygen obtained from breathing | Takes in oxygen from environment |
| Produces carbon dioxide | Removes carbon dioxide produced during respiration |

# WHAT DO WE BREATHE OUT?

| | Inhaled air | Exhaled air |
|---|---|---|
| **Oxygen** | Contains 21% oxygen (**more oxygen** than exhaled air) | Contain 16% oxygen (**less oxygen** than inhaled air) |
| **Carbon Dioxide** | Contain 0.03% carbon dioxide (less carbon dioxide than exhaled air) | Contains about 4% carbon dioxide (more carbon dioxide than inhaled air) |
| **Water vapour** | Contain less water vapour | Contain more water vapour |


THANK YOU