INDIAN SCHOOL AL WADI AL KABIR **DEPARTMENT OF SCIENCE (2020 – 2021)**		
Class: X	**SUBJECT: BIOLOGY**	**Date: 29.11.2020**
HANDOUT	**Topic: LIFE PROCESSES II (Respiration)**	**A4 FILE FORMAT (PORTFOLIO)**
CLASS & SEC: X -….	**NAME OF THE STUDENT:**	**ROLL No.**

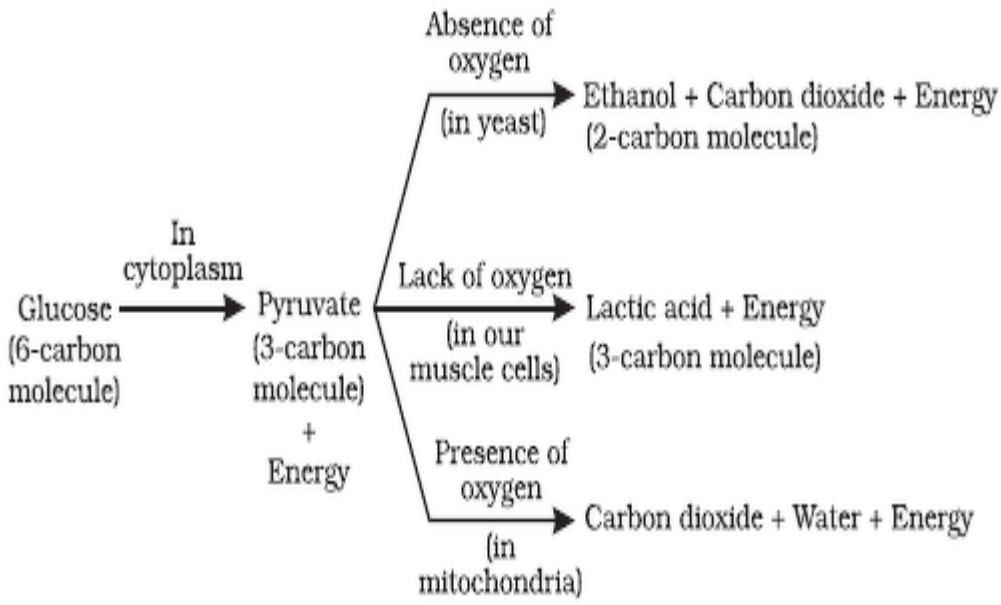
Respiration is defined as the process of oxidation of the organic compounds (Carbohydrates), to liberate energy, that can be used by the body cells.

Aerobic respiration: It occurs in the presence of oxygen in most plants and animals, yielding very high energy.

Anaerobic respiration: It occurs in the absence of oxygen. Food substances like glucose are not completely oxidized liberating less energy in tissue cells. It occurs, in bacteria yeast, fungi, internal animal parasites, etc.

Fermentation: It is a kind of anaerobic breakdown of carbohydrates by yeasts to produce alcohol and carbon dioxide.

Breakdown of glucose by various pathways:



The energy released during cellular respiration is immediately used to synthesise a molecule called
ATP which is used to fuel all other activities in the cell. In these processes, ATP is broken down giving rise to a fixed amount of energy which can drive the endothermic reactions taking place in the cell.

Aerobic respiration	Anaerobic respiration
1) It takes place in the presence of oxygen.	1) It takes place in the absence of oxygen.
2) In aerobic respiration, complete oxidation of glucose takes place.	2) In anaerobic respiration, the glucose molecule is incompletely oxidised.
3) End products are CO_2 and water.	3) End products are either ethyl alcohol or lactic acid and CO_2.
4) Lot of energy is liberated (38 ATP).	4) Relatively small energy is liberated (2 ATP).
5) It occurs in plant's and animal's cells.	5) Occurs in many anaerobic bacteria and human muscle cells.
6) $C_6H_{12}O_6 + 6O_2 \rightarrow 6\,CO_2 + 6H_2O + 686$ K.cal	6) $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2 + 56$ K.cal

Respiration in plants

- Plants exchange gases through stomata.
- **Lenticels** permit the exchange of gases between the environment and the internal tissue spaces of the organs (stems and **some** fruits). They permit the entrance of oxygen and simultaneously the output of carbon dioxide and water vapor.
- The large inter-cellular spaces ensure that all the cells are in contact with air.
- Carbon dioxide and oxygen are exchanged in and out of the cells by the process of Diffusion is directed by environmental conditions and the requirements of the plants.
- During night, in the absence of sunlight photosynthesis do not take place and hence carbon dioxide is released but not used up by the plants.
- During the day, there is no carbon dioxide release because the released carbon dioxide is used up by the plants for photosynthesis.
- Oxygen is released instead of carbon dioxide during the day.

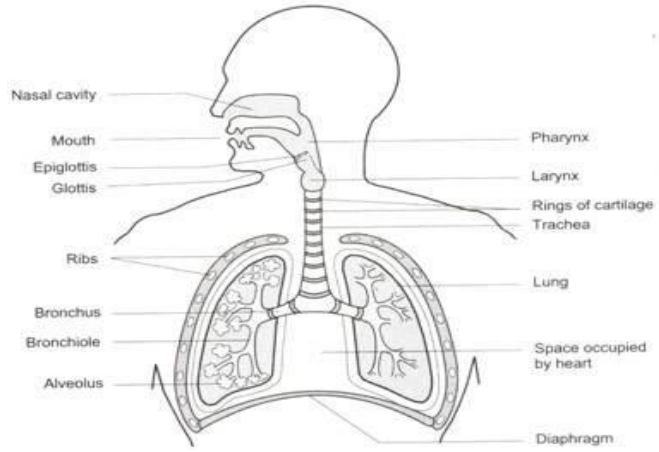
Respiration in Terrestrial and aquatic animals

Terrestrial animals can breathe the oxygen in the atmosphere, but animals that live in water (aquatic animals) need to use the oxygen dissolved in water.
Since the amount of dissolved oxygen is fairly low compared to the amount of oxygen in the air, the rate of breathing in aquatic organisms is much faster than that seen in terrestrial organisms.

Common features of all respiratory organs:

1. All the respiratory organs have a large surface area to get enough oxygen.
2. All the respiratory organs have thin walls for easy diffusion and exchange of respiratory gases.
3. All the respiratory organs like skin gills, and lungs have a rich blood supply for transporting respiratory gases.

Human respiratory system: a pair of nostrils (external and internal), pharynx, larynx, trachea (wind pipe), bronchi, bronchioles, alveoli.



Human respiratory system

Mechanism of Breathing

Inhalation

- During inhalation, the thoracic cavity (chest cavity) expands
- Ribs lift upwards
- Diaphragm become flat in shape
- Volume of lungs increases and air enters the lungs

Exhalation

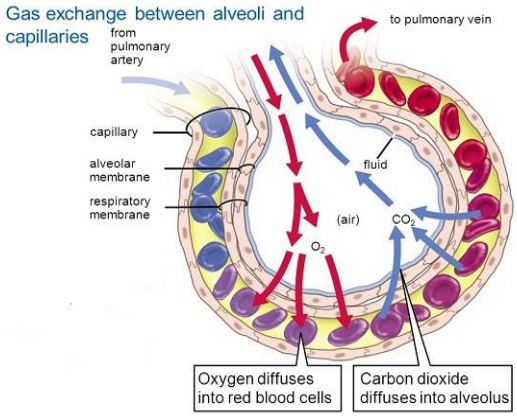
- Thoracic cavity contracts
- Ribs move downwards
- Diaphragm become dome shaped
- Volume of lungs decreases and air exits from the lungs.

Residual volume:

During the breathing cycle, when air is taken in and let out, the lungs always contain a residual volume of air so that there is sufficient time for oxygen to be absorbed and for the carbon dioxide to be released.

Transport of gases:

Haemoglobin in red **blood** cells have large affinity for **oxygen**. It temporarily, combines with **oxygen** to form oxyhaemoglobin and thus, **oxygen is** carried from the lungs to various **body** parts. **CO_2** is highly soluble in water, so it is mostly **transported** in dissolved form in our **blood** plasma.



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