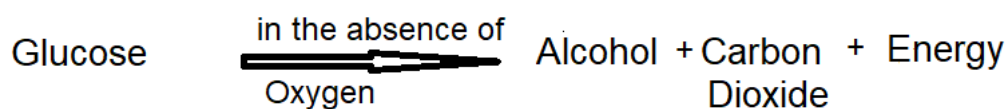


## Introduction

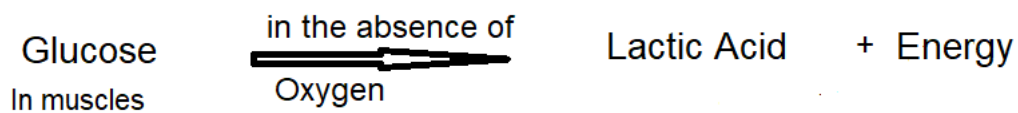
- All living organisms respire to extract energy from food.
- Living organisms are composed of cells which are responsible to perform some functions like nutrition, excretion, reproduction and transport.
- Cells need energy derived from food to perform these functions.

## Cellular Respiration

- The process in which food breaks down in the cells with the release of energy is called cellular respiration.
- Cellular respiration takes place in the cells of all organisms.
- In the cells food breaks down into carbon dioxide and water using oxygen. This is called Aerobic Respiration.
- When the breakdown of food takes place without using oxygen, it is called Anaerobic Respiration.



- Yeast is an organism which can live without because it obtains energy by the process of anaerobic respiration. Such organisms are called **anaerobes**.
- In anaerobic respiration, anaerobes like yeast breaks down glucose to produce alcohol, carbon dioxide and release energy.
- Our muscle cells can also respire anaerobically, for a short time, in case of temporary deficiency of oxygen.
- During heavy physical exercise, fast running, cycling or heavy weight lifting, the demand for energy is high and supply of oxygen is limited
- In such situations, anaerobic respiration takes places in the muscle cells to meet the demand of energy.



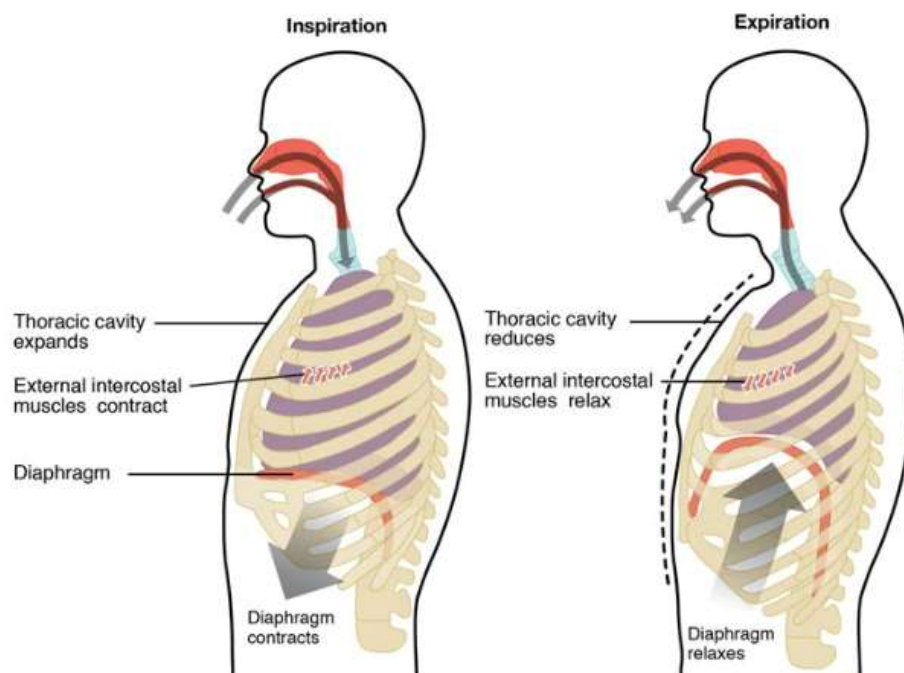
## Breathing

- Breathing is the process of taking in air rich in oxygen and giving out air rich in carbon dioxide by using respiratory organs.
- The taking in of air rich in oxygen is called inhalation and giving out of air rich in carbon dioxide is known as exhalation.
- One breath means one inhalation plus one exhalation.
- Breathing continuously takes place throughout the life of an organism.

- The number of times a person breathes in a minute is termed as the breathing rate.

## Breathing Process

- Normally air is taken through our nostrils. When we inhale air, it passes through our nostrils passes through the nasal cavity and wind pipe and reaches our lungs.
- Lungs are present in the chest cavity which is surrounded by ribs on the sides.
- At the bottom of the chest cavity, a muscular sheet called diaphragm is present.
- Breathing involves the movement of the diaphragm and the rib cage. when inhalation takes place, ribs move up and outwards and diaphragm moves downwards.
- This movement increases space in our chest cavity and air rushes into the lungs. As a result, the lungs get filled with air and expand.
- When exhalation takes place, ribs move down and inwards, while diaphragm relaxes and moves up to its actual position.
- As the size of the chest cavity is reduced, air is pushed out from the lungs.



## Mechanism of breathing: Activity

- A big bell jar is taken. A glass tube is selected which is branched into two smaller tubes at its lower end and is attached to the mouth of the bell jar with the help of a cork.

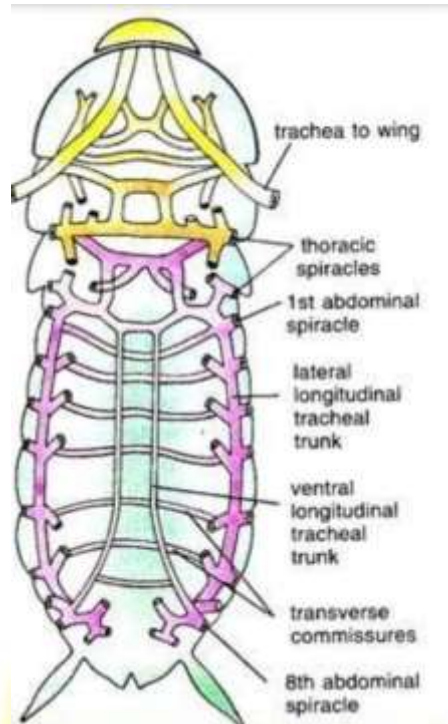
- At the two end of the tubes, two balloons are tied. A thin rubber sheet is tied around the open bottom of the jar.
- In this activity, the space inside the jar represents the chest cavity. The balloon represents the lungs whereas the rubber sheet represents the diaphragm.
- To show the process of breathing in air, the rubber sheet is pulled down. As a result, the space increase and air rushes in through the tubes and the balloon gets inflated. This depicts inhaling of air.
- To show the process of breathing out air, the rubber sheet is released. As a result, the space in jar decreases and the air goes out and the balloons gets deflated. This depicts exhaling of air.

## Sneezing

- Sneezing is the reflex action that occurs due to cold or due to inhalation of foreign particles that causes irritation inside the nose.
- The air around us consist of many types of unwanted particles like smoke, pollens, dust etc.
- During inhalation, these particles get trapped in the hair present in our nasal cavity.
- Sometimes these pass the hair in the nasal cavity which may irritate the lining of the cavity. As a result, we sneeze to expel the foreign particle from the inhaled air and clean air enters our body.

## Respiration in Cockroach

- A cockroach has small openings called spiracles on the sides of its body.
- Insects have a network of air tubes called tracheae for gas exchange.
- Oxygen rich air enters through the spiracles into the tracheal tubes, diffuses into the body tissue, and reaches every cell of the body.
- Similarly, carbon dioxide from the cells enters into the tracheal tubes and moves out through spiracles.
- These air tubes or tracheae are found only in insects and not in any other group of animals.



## Respiration in Earthworm

- The skin of an earthworm is moist and slimy to touch. Gases can easily pass through the skin.
- Though frogs also have a pair of lungs similar to human beings, they can also breathe through their skin, which is moist and slippery.