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**Class 7th**

**Chapter- 6**

**Respiration in  
Organism**

## **WHY DO WE RESPIRE? CELLULAR RESPIRATION**

All living organisms respire to get energy from food. During breathing, we breathe in air. You know that air contains oxygen. 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. In the cells, oxygen in the air helps in the breakdown of food. 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.

## **AEROBIC AND ANAEROBIC RESPIRATION**

In the cell, the food (glucose) is broken down into carbon dioxide and water using oxygen. When breakdown of glucose occurs with the use of oxygen it is called aerobic respiration. Food can also be broken down, without using oxygen. This is called anaerobic respiration. Breakdown of food releases energy.



There are some organisms such as yeast that can survive in the absence of air. They are called anaerobes. They get energy through anaerobic respiration. In the absence of oxygen, glucose breaks down into alcohol and carbon dioxide, as given below:



Our muscle cells can also respire anaerobically, when there is a temporary deficiency of oxygen. During heavy exercise, fast running, cycling, walking for many hours or heavy weight lifting, the demand for

energy is high. But the supply of oxygen to produce the energy is limited. Then anaerobic respiration takes place in the muscle cells to fulfil the demand of energy:



**Que. Why you get muscle cramps after heavy exercise?**

**Ans**

The cramps occur when muscle cells respire anaerobically. The partial breakdown of glucose produces lactic acid. The accumulation of lactic acid causes muscle cramps. We get relief from cramps after a hot water bath or a massage. Hot water bath or massage improves circulation of blood. As a result, the supply of oxygen to the muscle cells increases. The increase in the supply of oxygen results in the complete breakdown of lactic acid into carbon dioxide and water.

## **BREATHING**

Breathing means taking in air rich in oxygen and giving out air rich in carbon dioxide with the help of respiratory organs. The taking in of air rich in oxygen into the body is called inhalation and giving out of air rich in carbon dioxide is known as exhalation. It is a continuous process which goes on all the time and throughout the life of an organism.

The number of times a person breathes in a minute is termed as the breathing rate. During breathing inhalation and exhalation take place alternately. A breath means one inhalation plus one exhalation.

## **HOW DO WE BREATHE?**

**Normally we take in air through our nostrils. When we inhale air, it passes through our nostrils into the nasal cavity. From the nasal cavity, the air reaches our lungs through the windpipe. Lungs are present in the chest cavity. This cavity is surrounded by ribs on the sides. A large, muscular sheet called diaphragm forms the floor of the chest cavity.**

**Breathing involves the movement of the diaphragm and the rib cage. During inhalation, ribs move up and outwards and diaphragm moves down. This movement increases space in our chest cavity and air rushes into the lungs. The lungs get filled with air.**

**During exhalation, ribs move down and inwards, while diaphragm moves up to its former position. This reduces the size of the chest cavity and air is pushed out of the lungs. These movements in our body can be felt easily.**

## **SNEEZING**

**The air we inhale contains various types of unwanted particles like smoke, dust, pollen, etc. During inhalation, these particles get trapped in the hair present in our nasal cavity. They cause irritation in the lining of the nasal cavity, as a result of which we sneeze. Sneezing expels the foreign particles from the inhaled air so that dust-free, clean air may enter into the lungs.**

## **BREATHING IN OTHER ANIMALS**

**Animals such as elephants, lions, cows, goats, frogs, lizards, snakes, birds, have lungs in their chest cavities like the human beings.**

**Cockroach:** A cockroach has small openings on the sides of its body. These openings are called spiracles. Insects have a network of air tubes called tracheae for gas exchange.

Oxygen rich air rushes through spiracles into the tracheal tubes, diffuses into the body tissue, and reaches every cell of the body. Similarly, carbon dioxide from the cells goes 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.

**Earthworm:** Earthworms breathe through their skins. The skin of an earthworm feels moist and slimy on touching. Gases can easily pass through them. Though frogs have a pair of lungs like human beings, they can also breathe through their skin, which is moist and slippery.

### **BREATHING UNDER WATER**

There are many organisms which live in water. Gills in fish help them to use oxygen dissolved in water. Gills are projections of the skin. Gills are well supplied with blood vessels for exchange of gases.

### **DO PLANTS ALSO RESPIRE?**

Plants require oxygen for respiration, the process in return gives out carbon dioxide. Plants do not possess any specialized structures for exchange of gases. The leaves of the plants have tiny pores called stomata for exchange of oxygen and carbon dioxide. Plants breathe differently, through a process known as Cellular respiration.

In this process of cellular respiration, plants uses oxygen to break down glucose into carbon dioxide and water molecules through

**photosynthesis by capturing energy from sunlight and converting it into glucose.**

**Respiration in Roots:** The root cells also need oxygen to generate energy. Roots take up air from the air spaces present between the soil particles.

**Respiration in Leaves:** The leaves of the plants have tiny pores on their surface which are called stomata. The exchange of gases, i.e.  $O_2$  and  $CO_2$  in the leaves takes place through stomata during respiration. The oxygen enters into a leaf through stomata and reaches the cells of the leaf through diffusion while  $CO_2$  produced during respiration also diffuses from the leaf through the stomata.

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