

CLASS X/ BIOLOGY

LIFE PROCESS

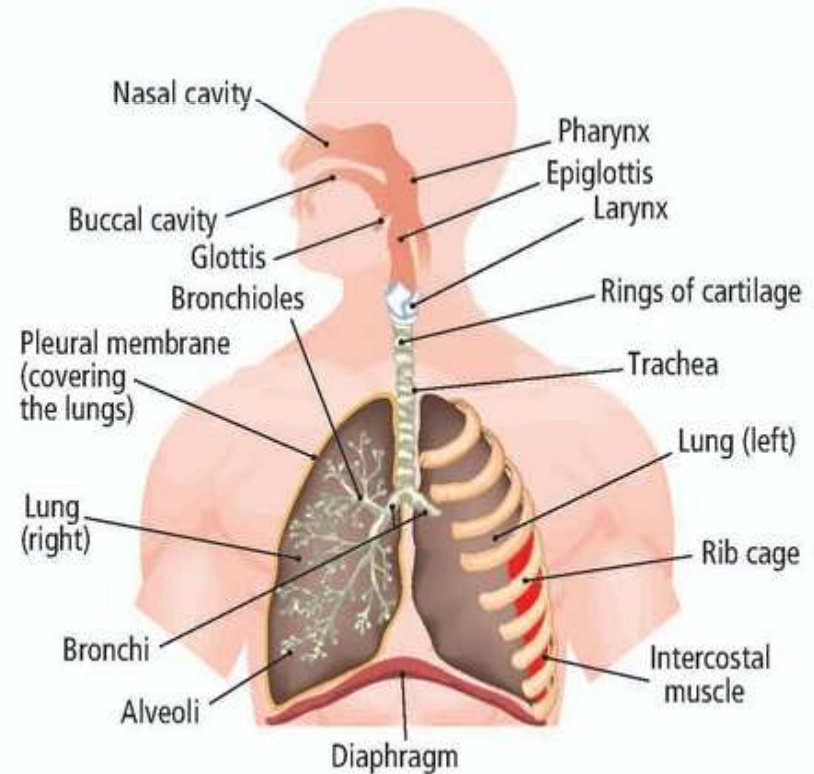
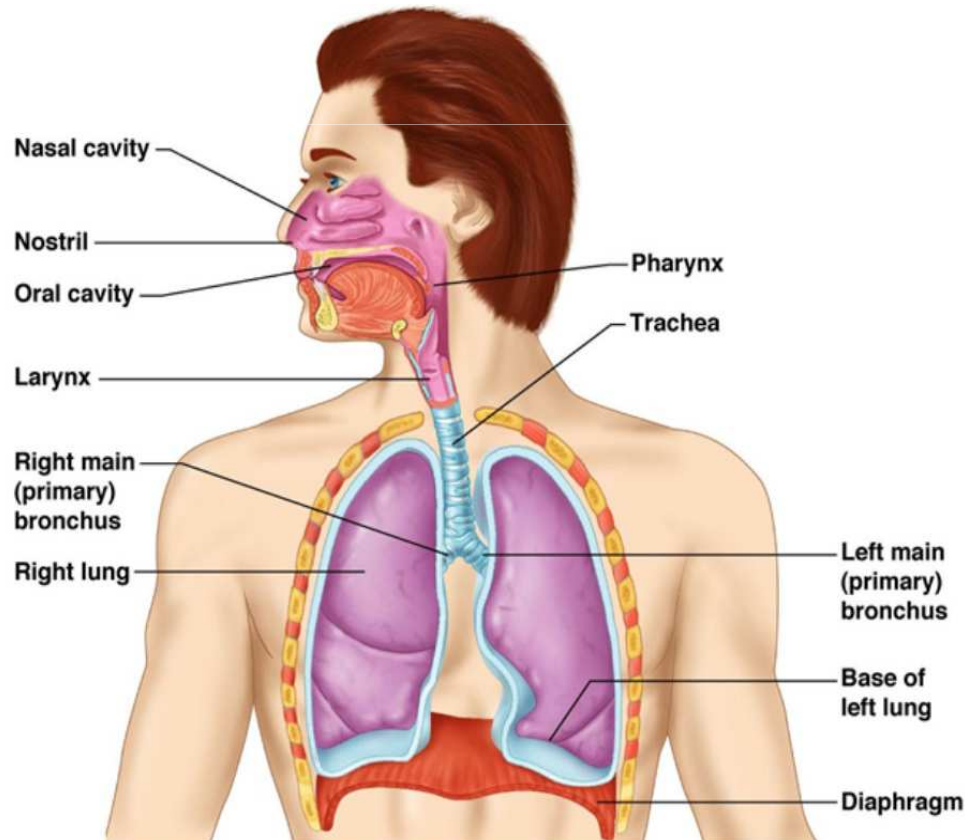
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RESPIRATION IN HUMAN BEINGS

Respiratory system includes respiratory tract and lungs.

Respiratory tract includes nose, pharynx, larynx and trachea.



NOSE

Nose has nostrils and bears two openings leading into nasal cavity which open into the pharynx. Air entering the nasal chamber become moist, warm and dust free. Dust particle entrapped in the mucus.

PHARYNX

Pharynx is divided into three sections Nasopharynx in which both the internal nostril open. Oropharynx into which the mouth cavity opens and laryngopharynx which lies behind the larynx.

LARYNX (VOICE BOX)

It is the sound producing organ. It is a hollow cartilaginous structure at the upper end of the wind pipe. It lies in front of the laryngopharynx and bears an elevation in front called Adam's apple. Cavity of larynx is lined by a mucous membrane. Glottis is a slit – like aperture in between two elastic ligaments covered by a mucous membrane. Sound is produced due to vibration developed in the vocal cord during expiration.

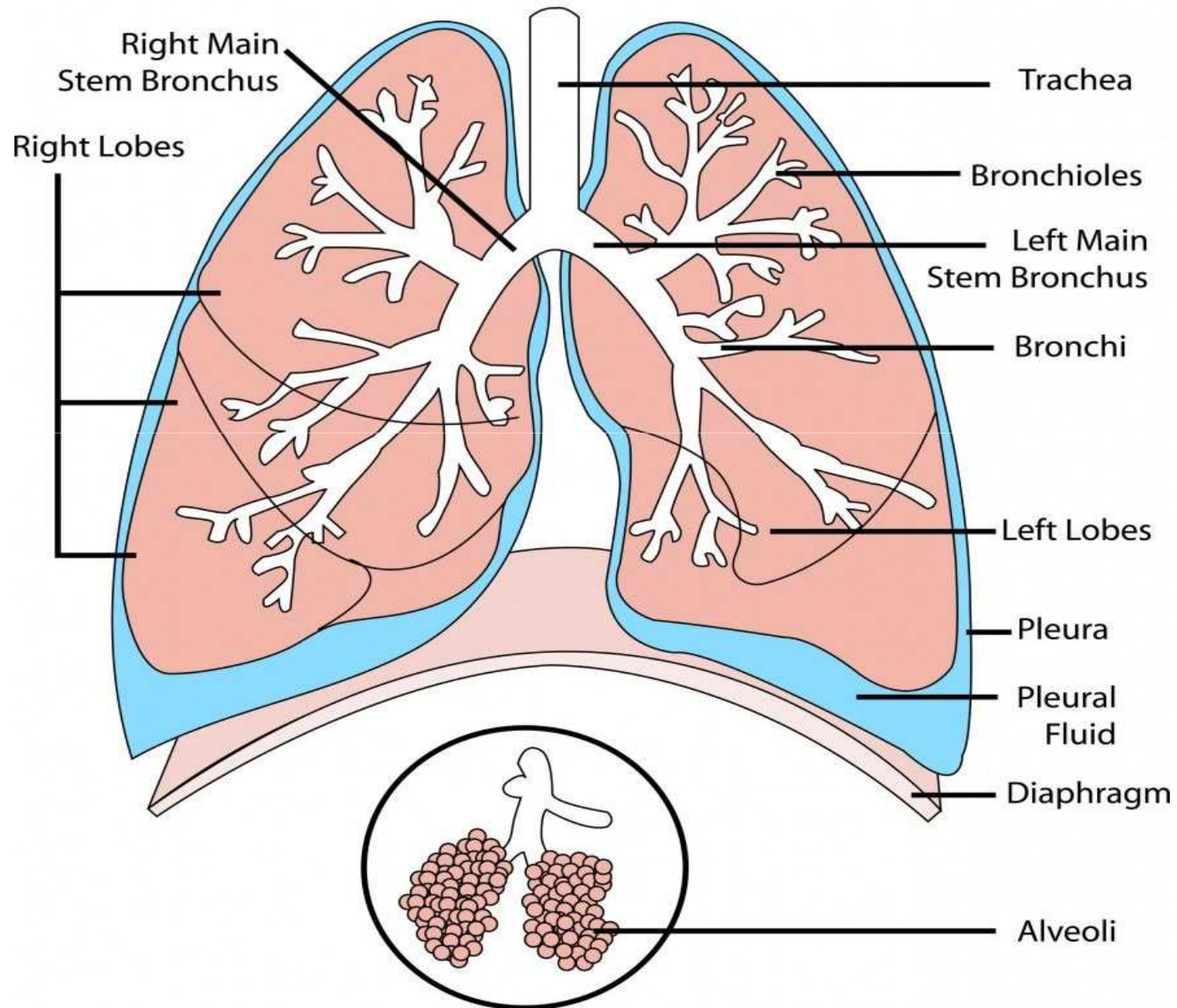
TRACHEA

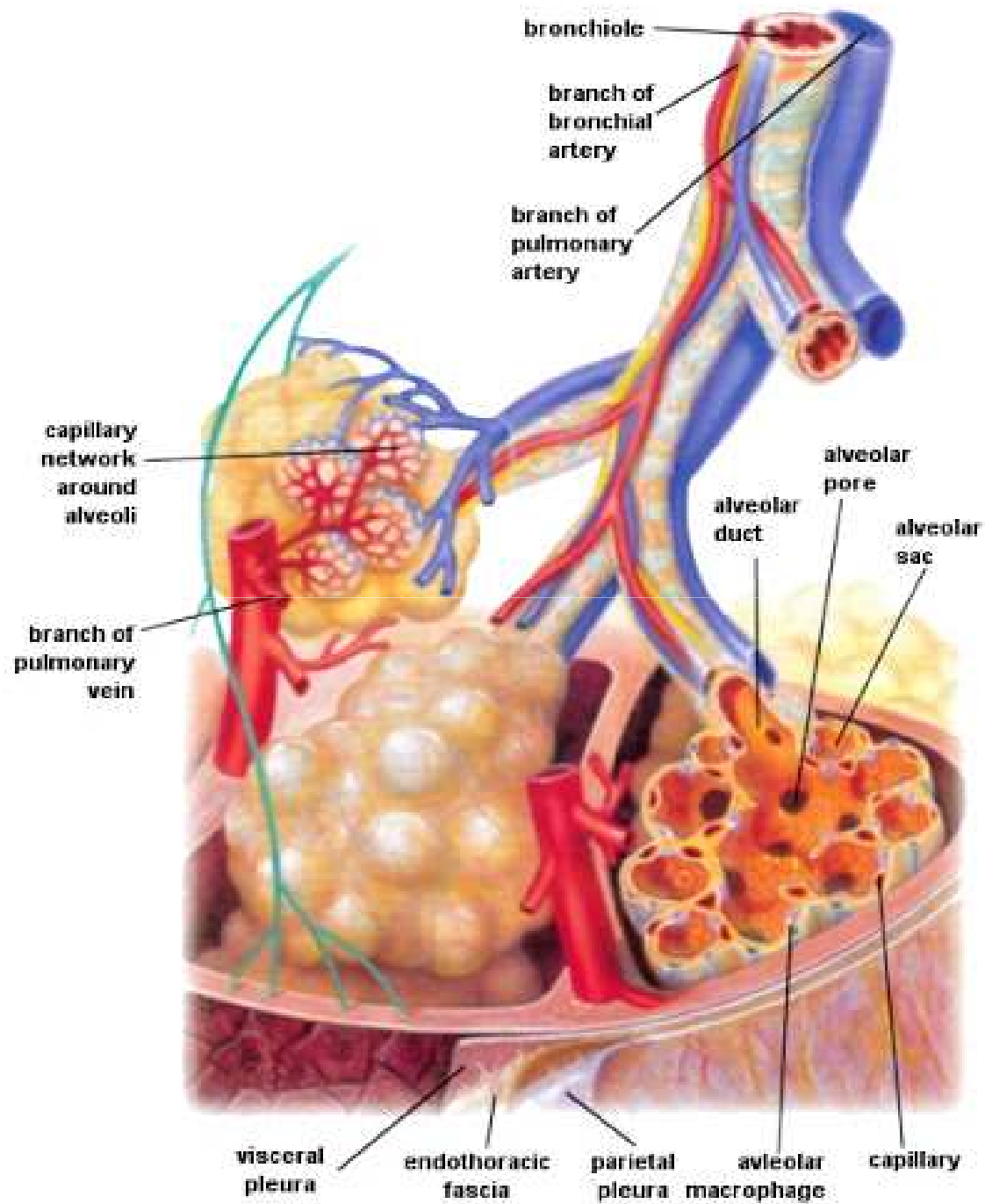
It is a thin walled long tube lined by ciliated epithelium. In its wall C- shaped incomplete cartilaginous rings are present. These prevent trachea from collapsing . It runs through the neck, extending from the larynx to the chest in front of the oesophagus. After entering the chest it divides into two – right and left bronchi.

LUNGS

- ❖ Lungs are two soft, conical structures lodged in the thoracic cavity.
- ❖ The left lung has two (upper and lower) lobes whereas the right lung has three (upper, middle and lower) lobes.
- ❖ Each lung has a covering of a serous membrane called pleura.
- ❖ Lungs include the bronchi and bronchiole alveolar ducts and alveoli.
- ❖ Two primary bronchi enter the lungs of its own site.
- ❖ Each bronchus after the entering the lung divides and redivides for many branches called bronchioles.
- ❖ The structure of primary bronchus is similar to that of trachea.
- ❖ Tertiary bronchioles divide into thinner tubes called terminal bronchioles which further subdivide into respiratory bronchioles.
- ❖ Each respiratory bronchioles gives off numerous long thin-walled alveolar ducts.

Diagram of the Human Lungs





LUNGS

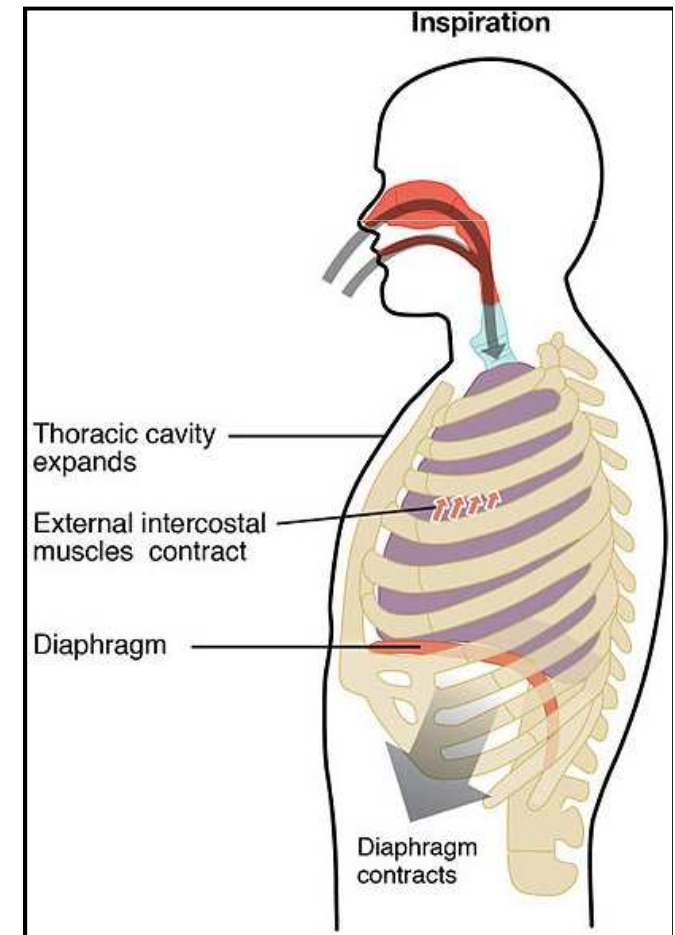
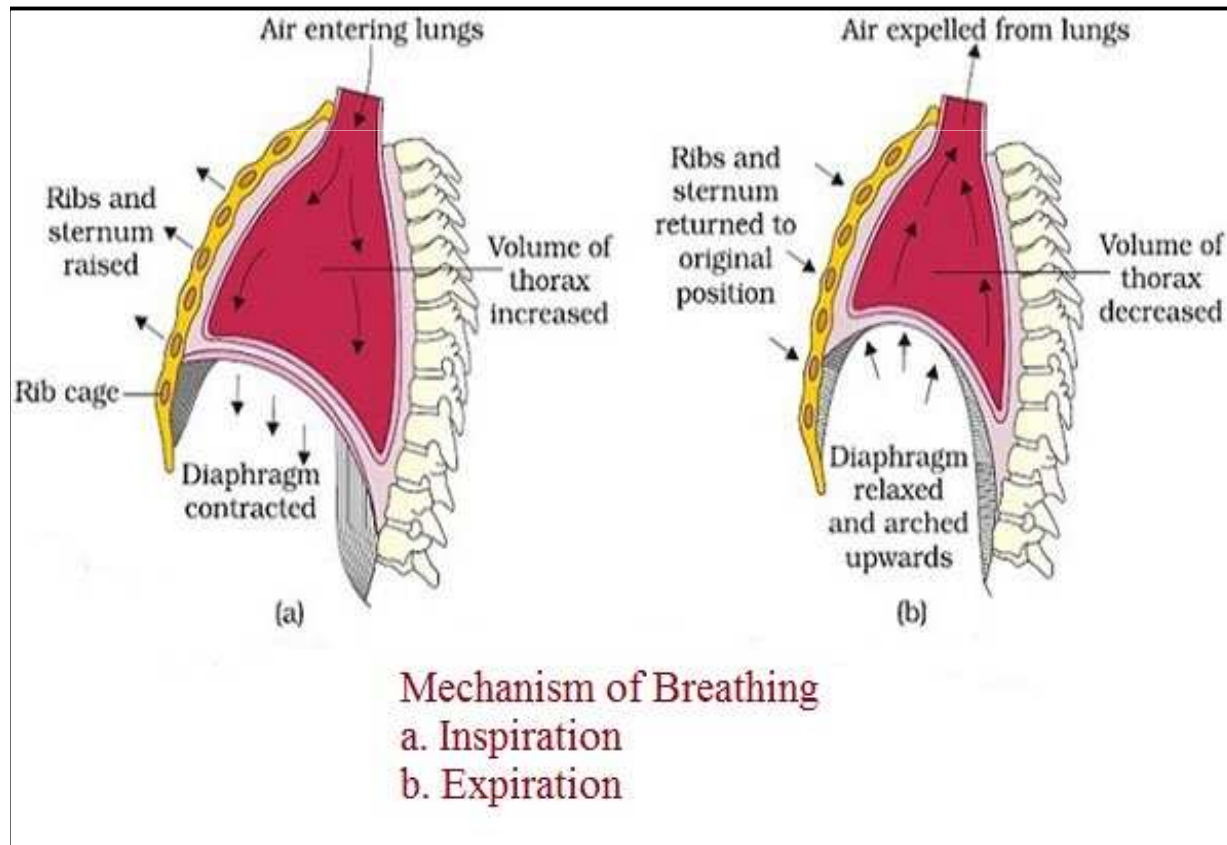
- ❖ Each alveolar duct terminates into an atrium.
- ❖ In each atrium two to five alveolar sacs open.
- ❖ Each alveolar sac gives off minute thin wall chambers, alveoli which open into alveolar sacs.
- ❖ Alveoli are surrounded by blood capillaries.
- ❖ About three hundred million alveoli are present in both the lungs.

DIAPHRAGM

It is a dome-shaped musculo-fibrous structure which separates the abdomen and thorax. It is composed of radiating muscle fibres attached in the centre with a central tendon and originates from the circumference of the trunk. During inspiration, intake of air, these muscles contract, making the diaphragm flat, thus increasing the volume of the thoracic cavity.

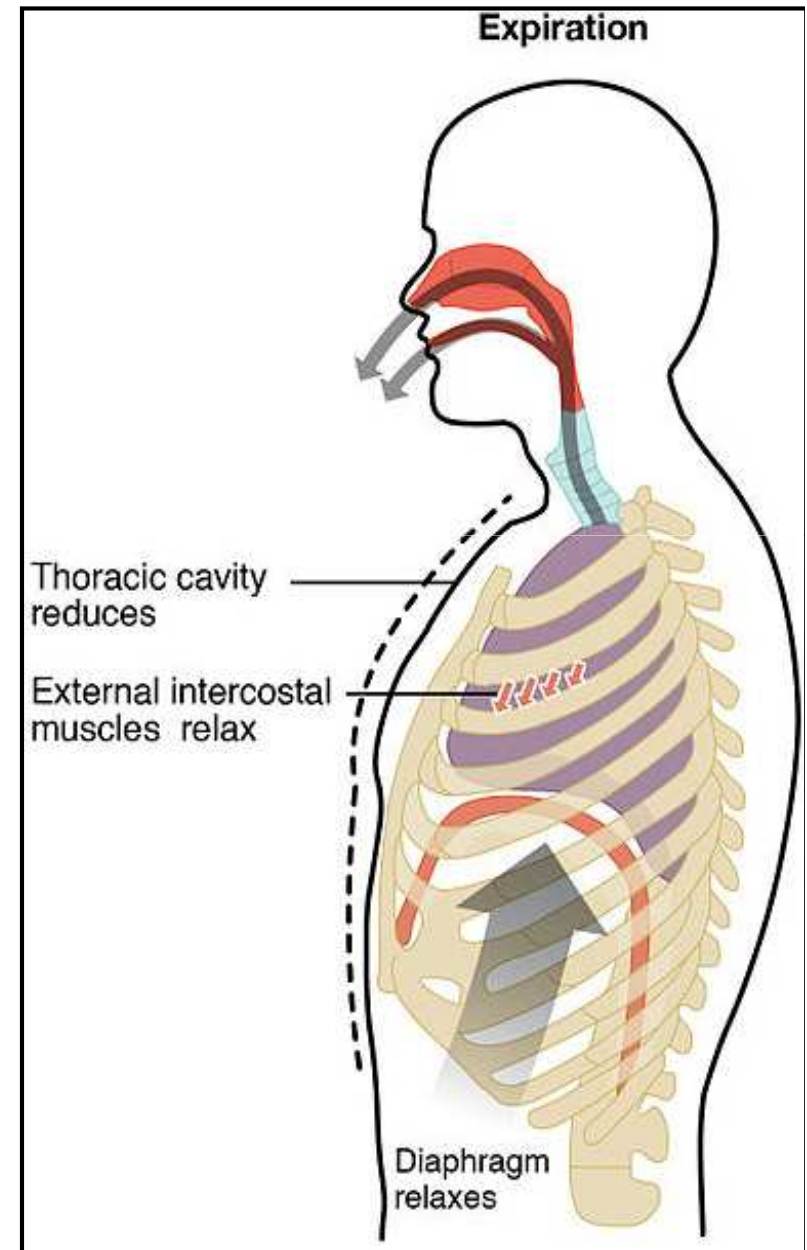
MECHANISM OF BREATHING

INSPIRATION: During inspiration muscles attached to ribs and diaphragm contract together increasing the volume of the thoracic cavity laterally and dorsoventrally. Thus air pressure decreases inside and air from outer side enter the lungs through nostrils, trachea and bronchi.



MECHANISM OF BREATHING

EXPIRATION: The muscle of diaphragm and other muscle attached to the ribs relax, the diaphragm becomes convex and the ribs attain their original shape. Thus the thoracic cavity decreasing in volume, allowing the lungs to return to their original size forcing the air outside the lungs through the same path.



EXCHANGE OF GASES

- ✓ Exchange of gases takes place between blood of capillaries surrounding the alveoli and air in the alveoli of lungs .
- ✓ It is in the alveoli that oxygen is taken into the body carbon dioxide is eliminated.
- ✓ In internal and external respiration gases diffused from higher pressure to lower pressure.
- ✓ During inspiration alveolar air contains more oxygen and less carbon dioxide whereas capillary blood as less oxygen more carbon dioxide.
- ✓ Hence carbon dioxide diffuses from alveolar air into the blood of arterial capillaries and diffuses from venous capillary blood into the alveoli .
- ✓ There are millions of alveoli in the lungs which provides a very large area for the exchange of gases.

TRANSPORT OF OXYGEN

Oxygen combine temporarily with the haemoglobin of red blood cells in lungs to form oxyhaemoglobin and its transported to various cells of the body. In tissues oxyhaemoglobin losses oxygen to form haemoglobin due to low concentration of oxygen and high concentration of carbon dioxide. Oxygen oxidises glucose liberating water and energy in the form of ATP.

TRANSPORT OF CARBON DIOXIDE

Carbon dioxide is liberated during the metabolic activities in the cell and diffuses into the blood within the capillaries. It is transported from tissues to lungs in two forms.

- i) Carbon dioxide combines with water of blood plasma forming carbonic acid.
- ii) Carbon dioxide combines with haemoglobin to form carboxy haemoglobin

Most of the carbon dioxide produced in the cells due to metabolism is carried in the form of bicarbonates to the lungs. Carbon dioxide combines with water of red blood cells to form carbonic acid and dissociate into H^+ and HCO_3^- . In haemoglobin sodium and potassium ions are found which combine with H^+ and HCO_3^- to form bicarbonates thus Carbon dioxide blood reaches the lungs and gets liberated into the alveoli.