OGUN DIGICLASS

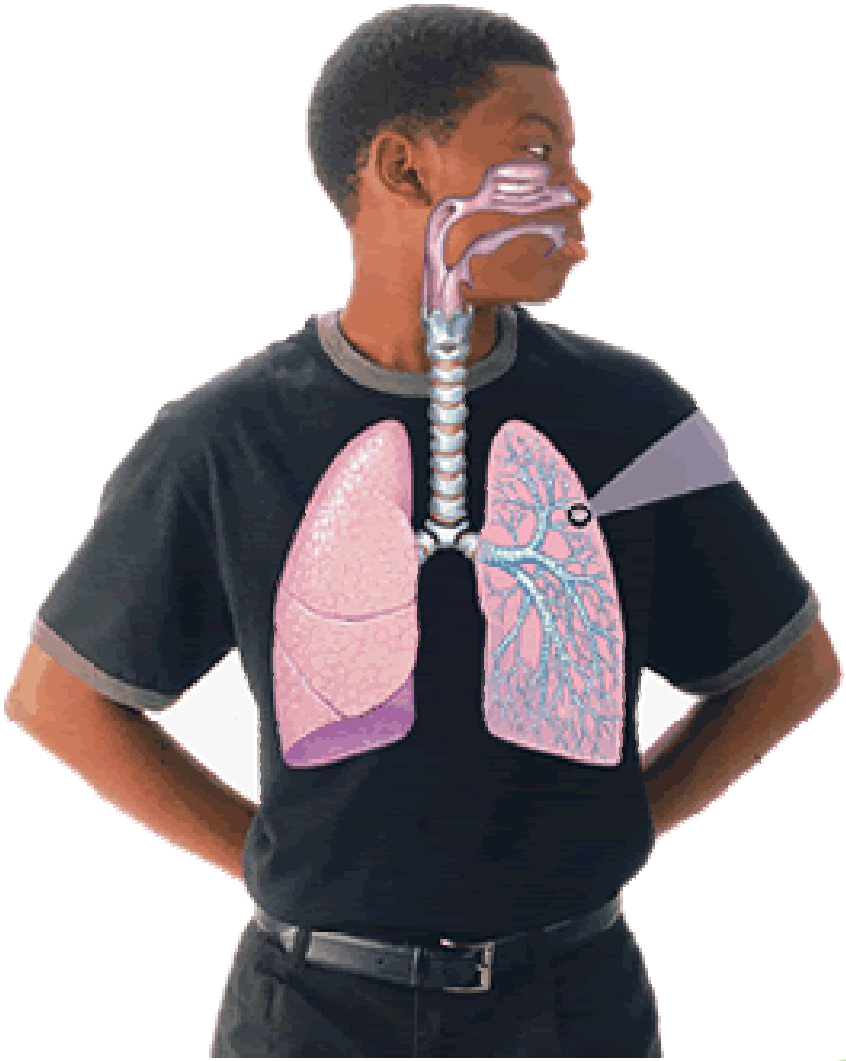
CLASS: SECONDARY SCHOOL

SUBJECT: BIOLOGY

TOPIC: RESPIRATORY SYSTEM

Respiratory System:

Breathe in and out…



The Respiratory System

- Phases or stages of respiration
- Conditions necessary for respiration
- Characteristics of respiratory surfaces
- The respiratory system of man

LEARNING OBJECTIVES

By the end of the lesson the students should be able to;

i. define respiration
ii. list stages or phases of respiration
iii. list and explain conditions necessary for respiration
iv. list characteristics of respiratory surfaces
v. explain the location of lungs in mammals
vi. explain the process of inhalation and exhalation in man.

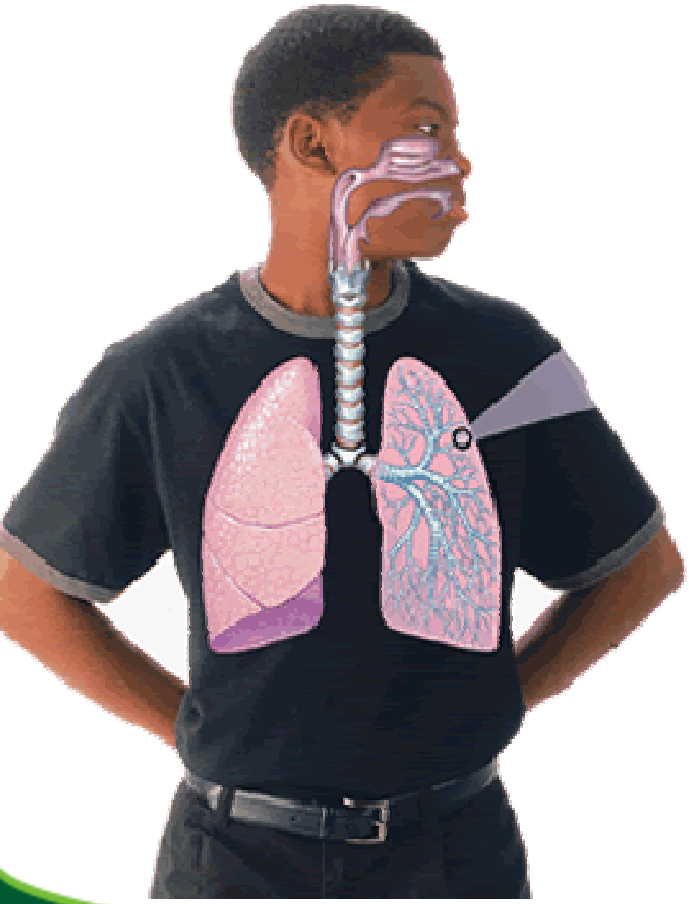
RESPIRATION

Respiration is a biochemical activity of the cell in which glucose is broken down by a series of reactions controlled by enzymes to release energy.

Phases or stages of respiration

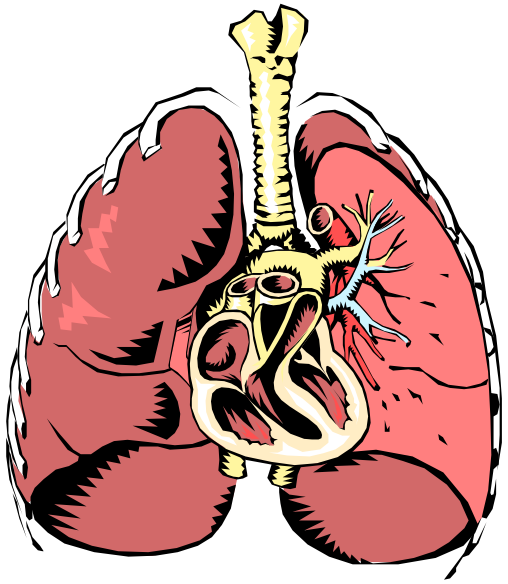
- External respiration (breathing)
- Internal (tissue) respiration

What is the RESPIRATORY SYSTEM?



- The system of the body that deals with **BREATHING**.
- It consists of the **NOSE**, **PHARYNX**, **TRACHEA**, **BRONCHIAL TUBES**, and **LUNGS**.

What is the FUNCTION of the Respiratory System?



- To **DELIVER OXYGEN** to the body.
- To **REMOVE CARBON DIOXIDE** from the body.

Why does the body need oxygen?

- The body's **CELLS** use **OXYGEN** to release **ENERGY** to the body.
- **CELLULAR RESPIRATION** is the **CHEMICAL REACTION** that uses **GLUCOSE** & **OXYGEN** to release **ENERGY**.
- **CARBON DIOXIDE** is a WASTE PRODUCT of this chemical reaction.

The Respiratory System

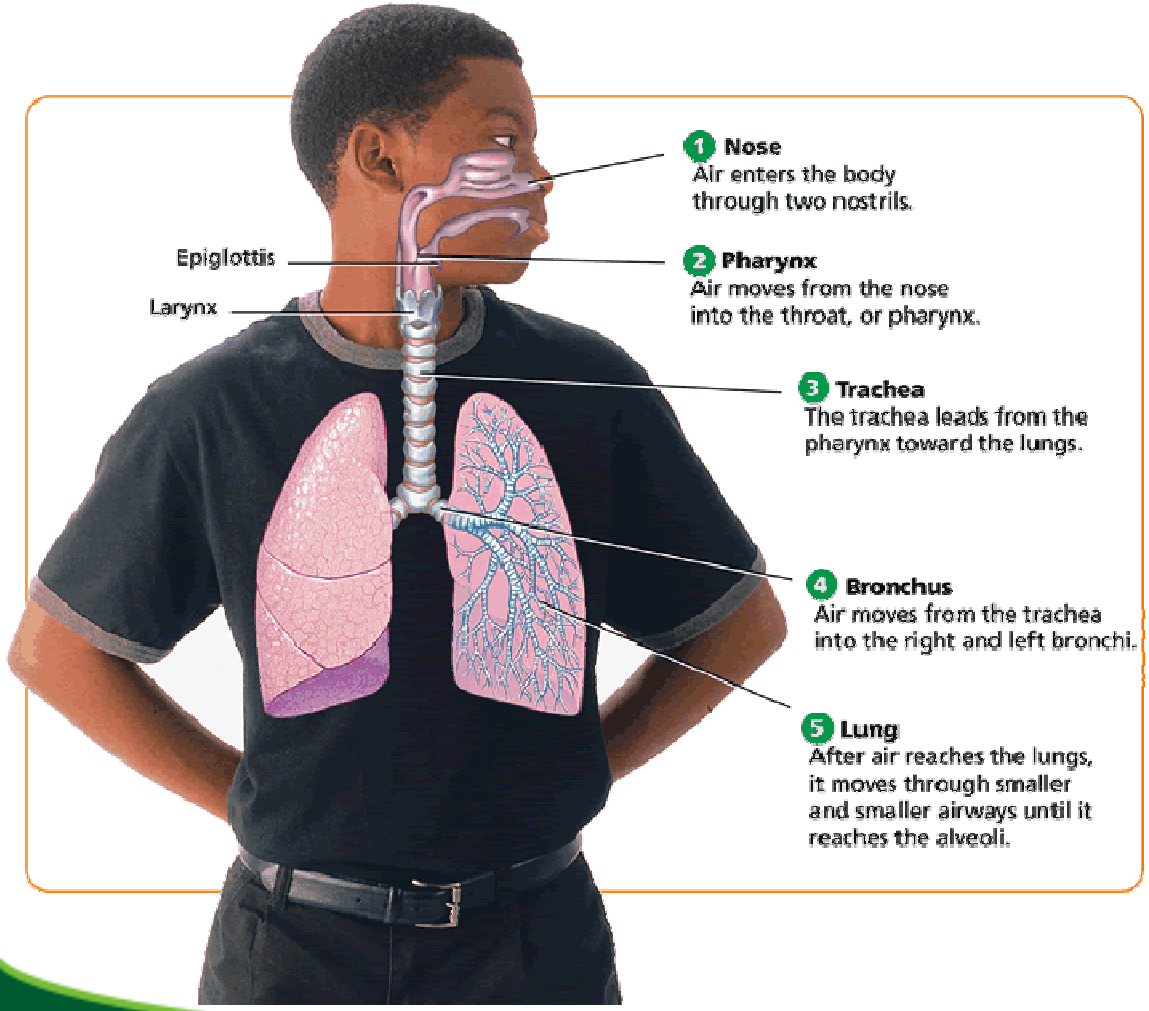
1. **External Respiration (Breathing):** it is the exchange of gases between the environment and the respiratory organs of living organism. It involves:
   a. **Inspiration or inhalation**: breathing in of oxygen into respiratory organs e.g. lungs, gills
   b. **Expiration or exhalation**: breathing out of air or carbon dioxide and water vapour into the environment.

2.) **Internal or tissue respiration**: it is the chemical activities of the cell in which glucose is broken down by enzymes in the presence of oxygen to release carbon dioxide, water and energy.

$C_6H_{12}O_6 + 6O_2 \xrightarrow{\quad} 6H_2O + 6CO_2 + Energy$

(glucose)(oxygen) (water) (carbondioxide) (ATP)

What path does AIR follow?



- **NOSE**
- **PHARYNX**
- **TRACHEA**
- **BRONCHIAL TUBES**
- **LUNGS (alveoli)**

What happens in each part?

NOSE – in the nasal cavity,

the air is:

- Warmed,
- **FILTERED**, and
- moistened.

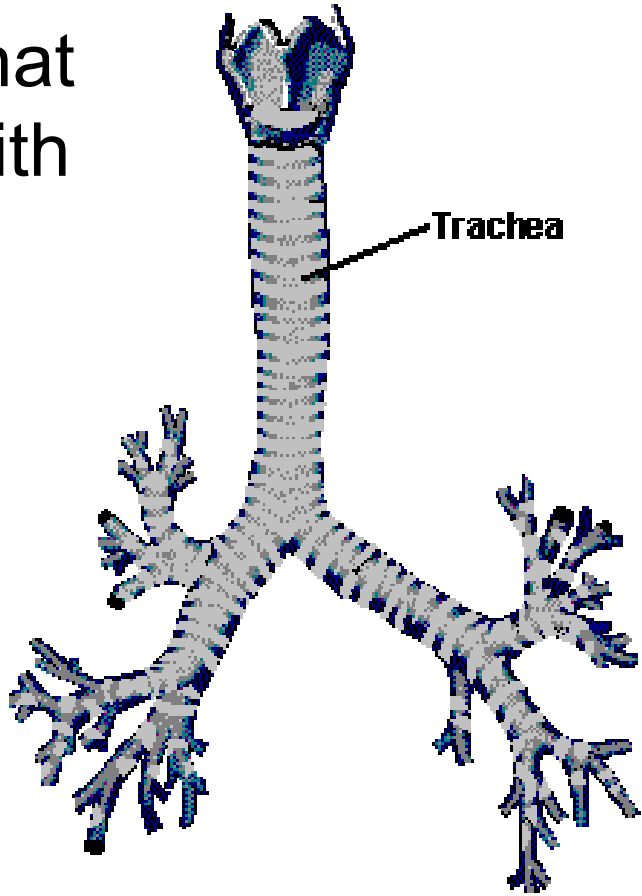
(Mucus and nasal hairs keep out dust, pollen and other particles).

- **PHARYNX** – air passes through the **THROAT** when breathing. The **EPIGLOTTIS** covers the trachea when you SWALLOW to prevent **FOOD** from entering the trachea when you eat/drink.

What happens in each part?

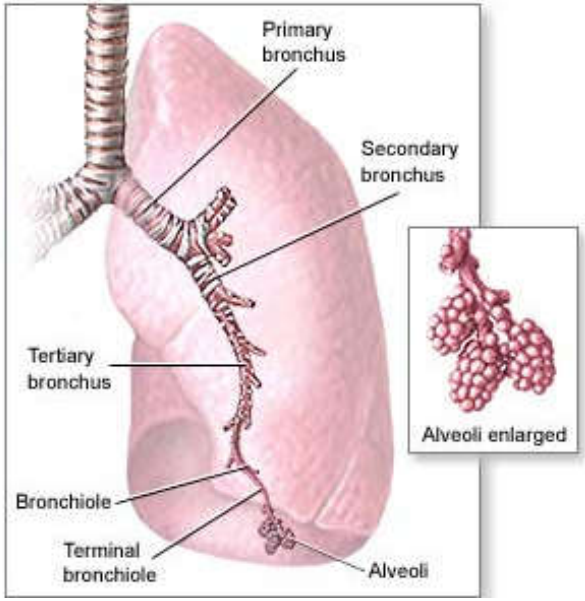
- **TRACHEA** – is the **WINDPIPE** that leads to the lungs. It is a TUBE with **RINGS OF CARTILAGE**.

- **BRONCHIAL TUBES** – are the the short tubes that branch off the trachea **TO CARRY AIR TO** the **LUNGS.**



What happens in each part?

- **LUNGS** – inside the lungs, the bronchi branch into **SMALLER TUBES**. At the end of the smallest tubes, are structures called **ALVEOLI**.

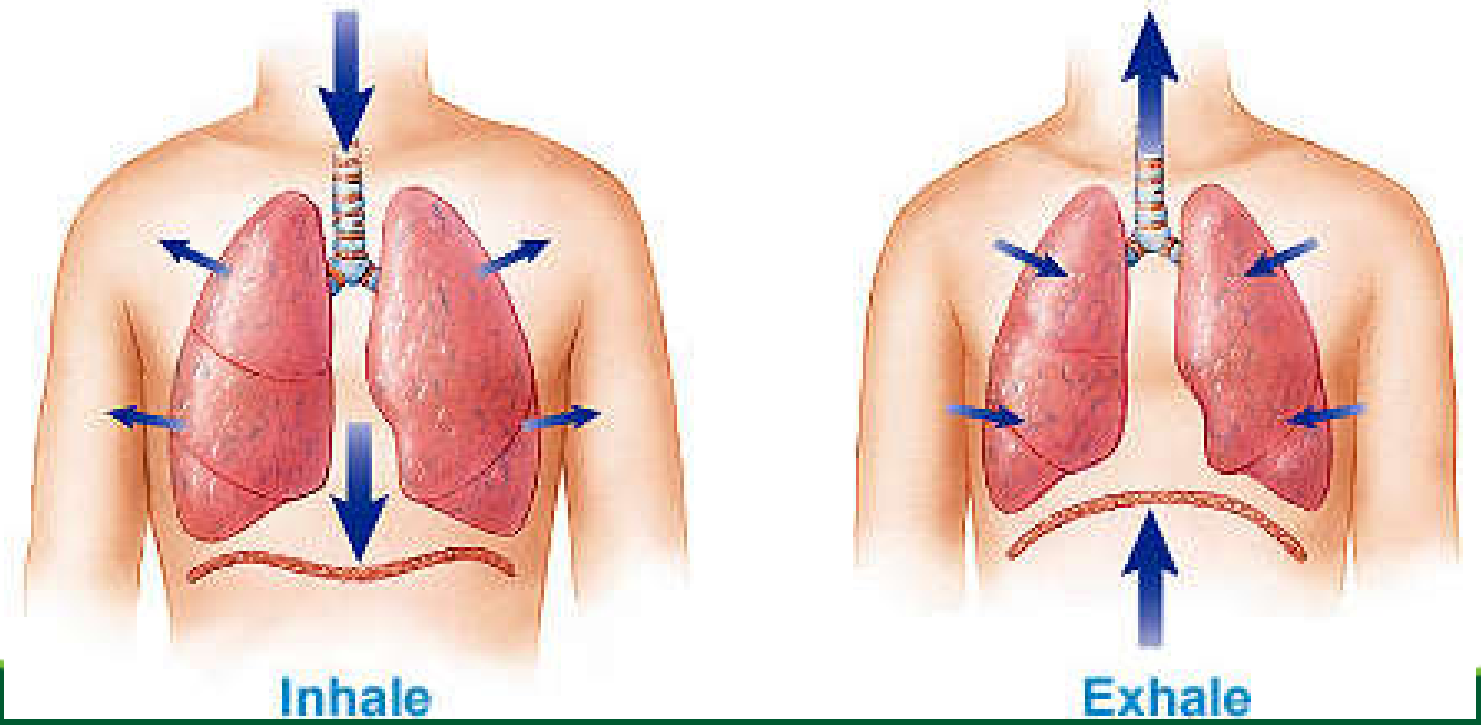


- **ALVEOLI** – are **AIR SACS**, surrounded by CAPILLARIES.

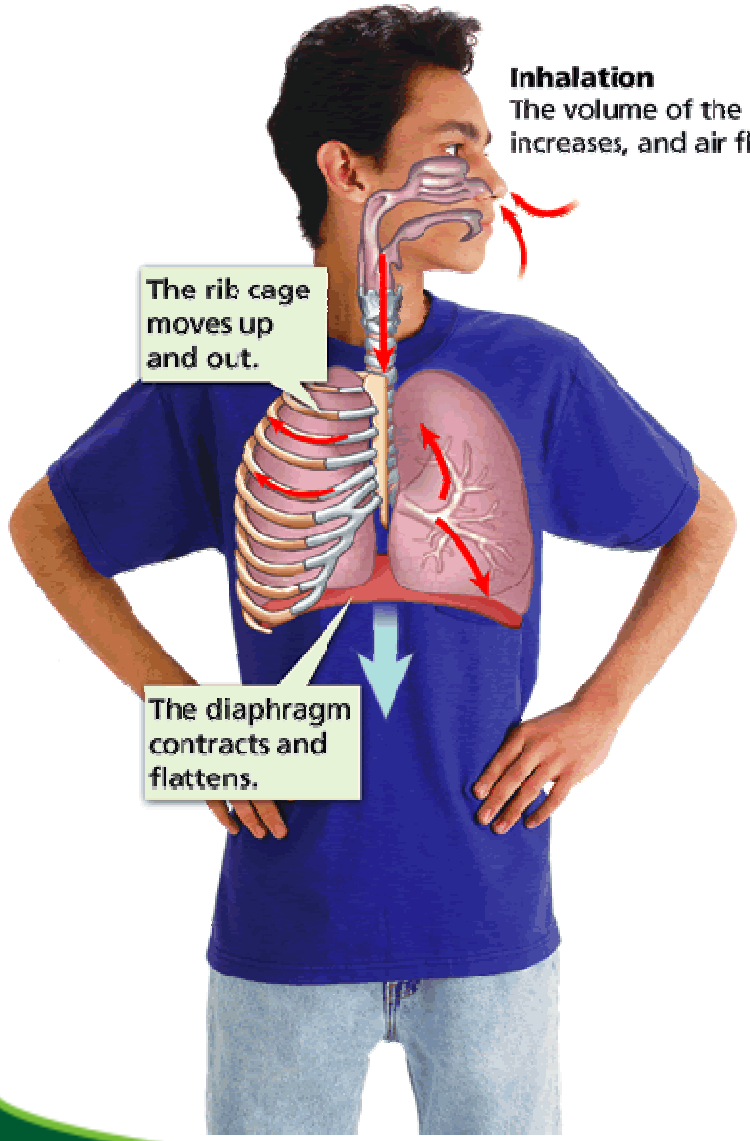
  This where BLOOD picks up **OXYGEN** and gets rid of **CARBON DIOXIDE**.

How do we BREATHE?

- When you breathe, the actions of your RIB MUSCLES and DIAPHRAGM, expand or contract your chest, changing the VOLUME of your lungs. As a result, AIR rushes in or out.



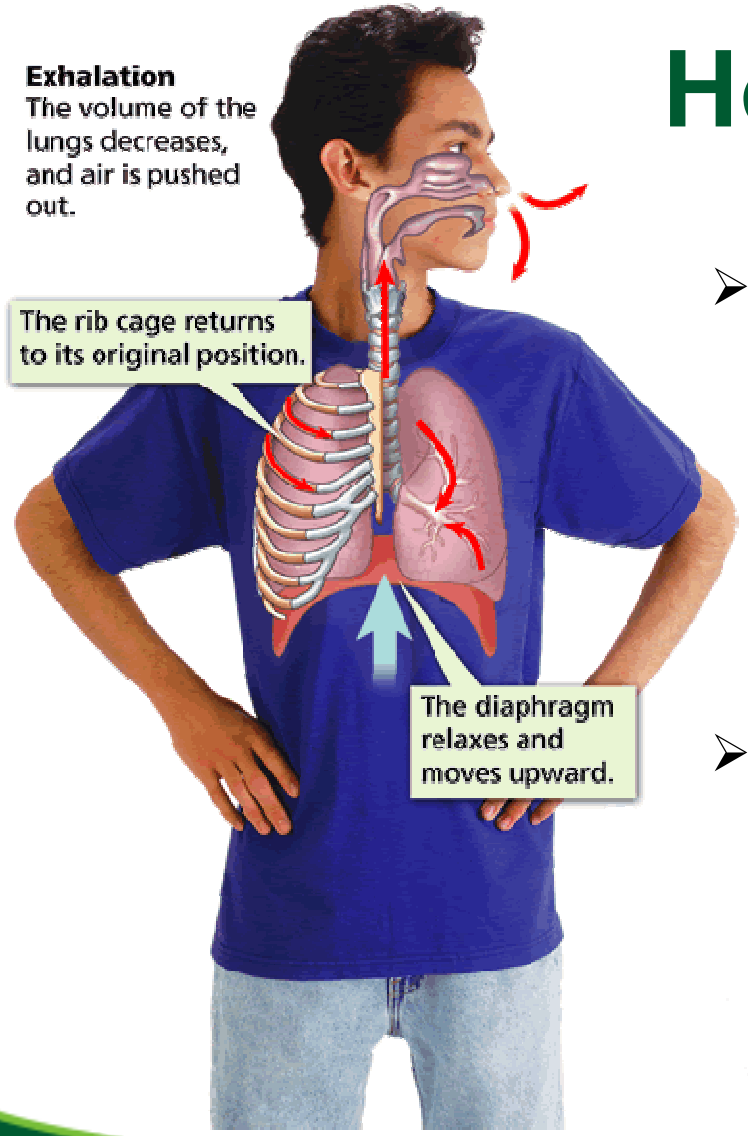
The Respiratory System - Breathe in and out…



How do we BREATHE?

- **INHALATION** - the **DIAPHRAGM** (a large dome-shaped muscle at the base of the lungs) contracts and moves **DOWN**. The RIB CAGE moves **UP & OUT**.
- The volume of the lungs **INCREASES**, and air **FLOWS IN**.

The Respiratory System - Breathe in and out…



How do we BREATHE?

- **EXHALATION** - the **DIAPHRAGM** relaxes and moves **UP**. The RIB CAGE relaxes and returns to its **ORIGINAL POSITION**.
- The volume of the lungs **DECREASES**, and air is **PUSHED OUT**.

Conditions Necessary For Respiration

1) **Respiratory medium**: surroundings where oxygen is obtained e.g. air, water
2) **Respiratory organ**: e.g. lungs and gills
3) **Transport medium**: e.g. blood
4) **Respiratory surface**: definite surface of the body for gaseous exchange e.g. surface of lungs .
5) **Ventilation**: movement of air or water over a respiratory surface.

Characteristics of respiratory surfaces

They are moist for gas to dissolve.

Thin surface or layer for faster diffusion.

They are highly vascularized or richly supplied with blood.

Large or broad surface area to aid easy diffusion of gases.

Highly permeable to gases.

Efficient transport medium.

Respiration in mammals

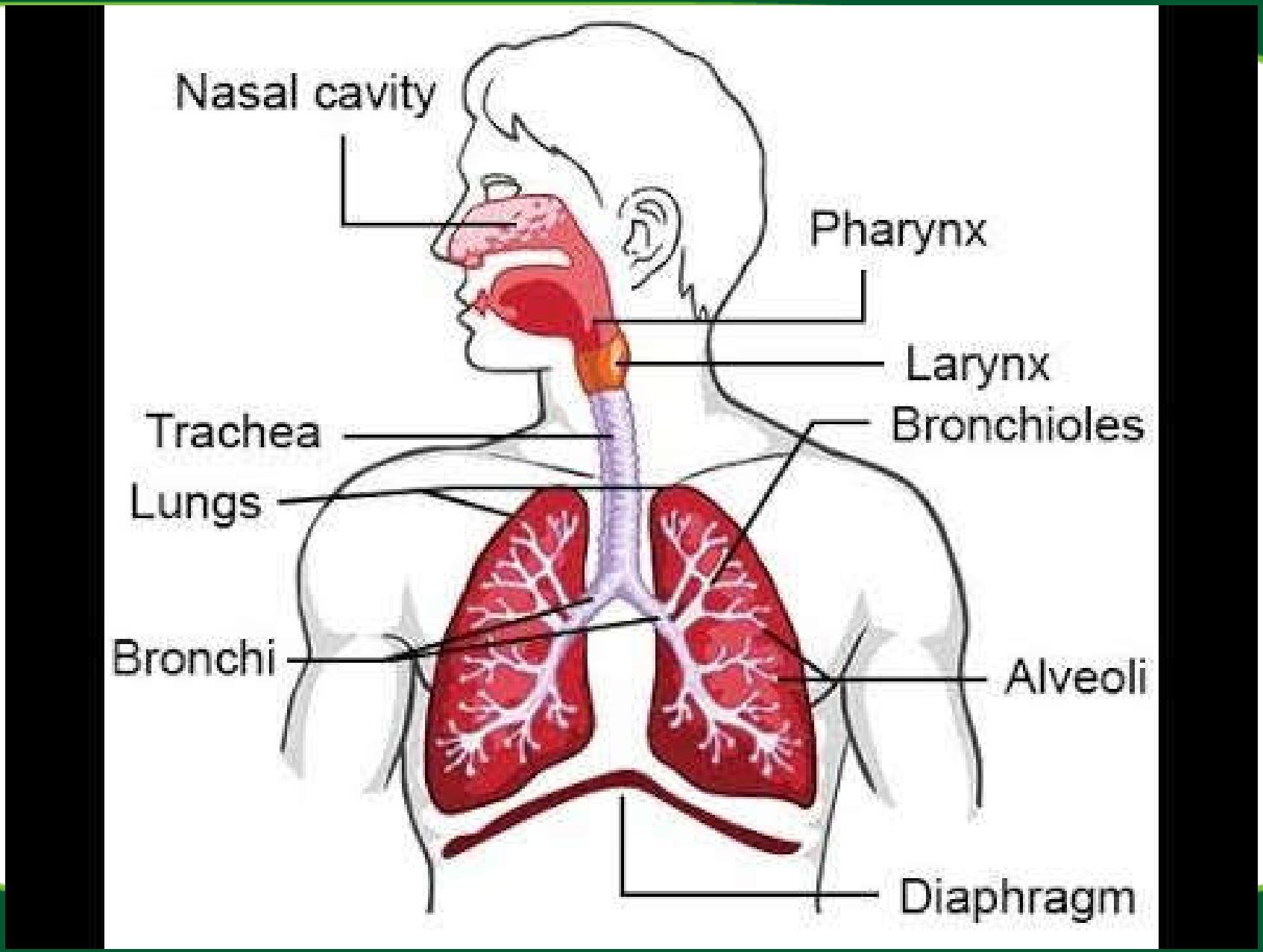
Respiratory organ is lung. Lung is a pair of reddish elastic organ or each side of the heart of mammals, located within the thoracic cavity with the diaphragm at the bottom, they are connected to one another by intercostal muscles.

The Respiratory System of Man

Air enters through the nostrils leading to the nasal cavity, pharynx, larynx (voice box), trachea (windpipe), bronchi, bronchioles and alveoli. Alveoli is the respiratory surface for exchange of gas.

Epiglottis covers the larynx to prevent food entry. Trachea and bronchi have rings of cartilage which strengthens and prevent them from collapsing

The Respiratory System



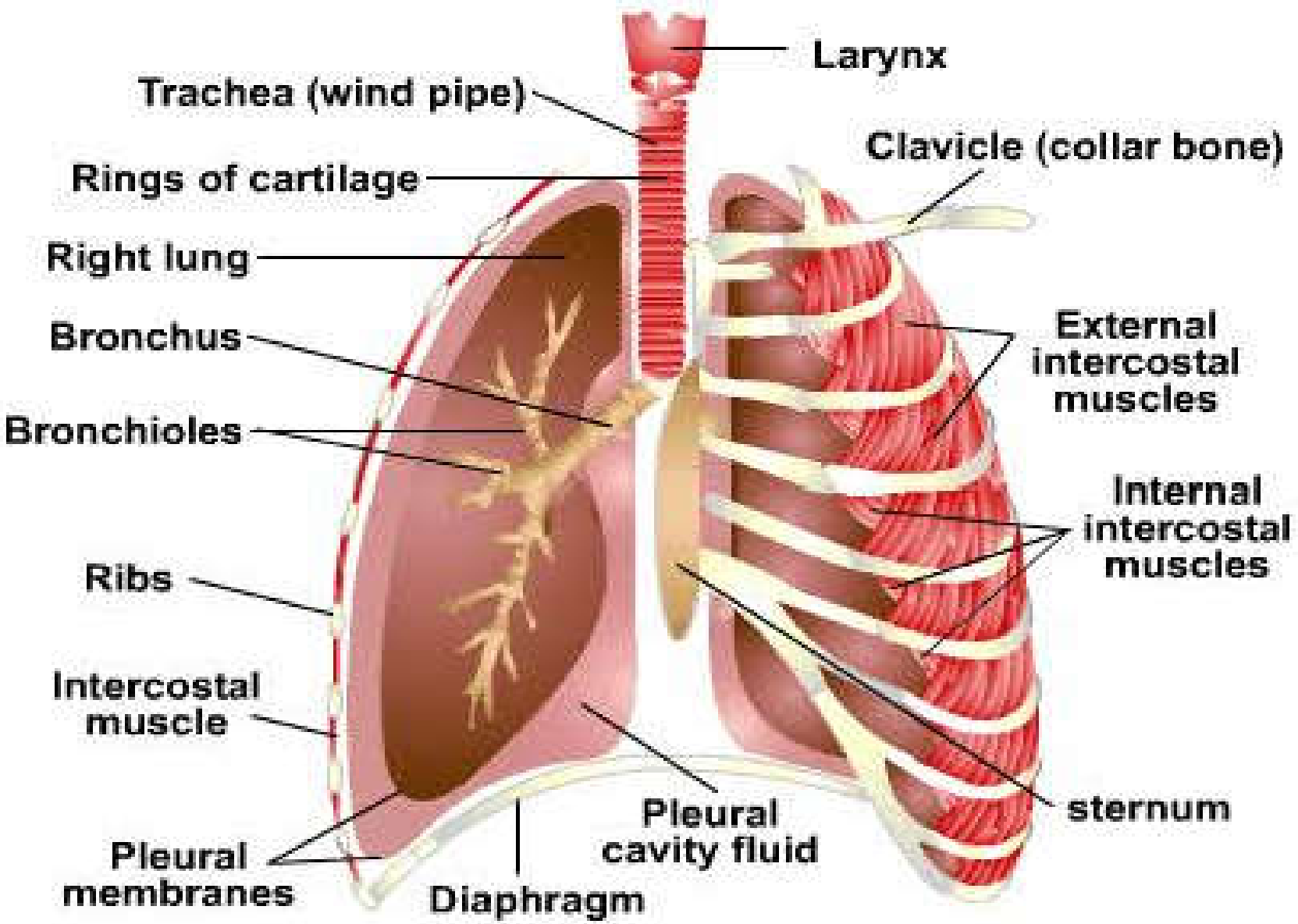
The Respiratory System

Air component	Inhaled air	Exhaled air
Oxygen	21%	16%
Carbon dioxide	0.03%	4.1%
Nitrogen	78%	78%
Water vapour	Variable	Saturated

Process of Inspiration and Inhalation

1. External intercostal muscles contract.
2. Internal intercostal muscles relax.
3. Ribs move upwards and outwards.
4. Sternum moves forward.
5. Diaphragm contracts and flattens.
6. Volume of thorax (thoracic cavity) increases.
7. Air pressure in thorax decreases.
8. Air flows into the lungs from the atmosphere to inflate or increase the size of the lungs.

The Respiratory System



Process of Expiration and Exhalation

1. External intercostal muscles relax.
2. Internal intercostal muscles contract.
3. Ribs move downward and inward.
4. Sternum moves inward.
5. Diaphragm relaxes and becomes dome shape.
6. Volume of thoracic cavity decreases.
7. Air pressure increases.
8. Air is forced out of lungs into the atmosphere to deflate the size of the lungs.

Assignment

1.) List five respiratory disease.

2.) What is residual air?