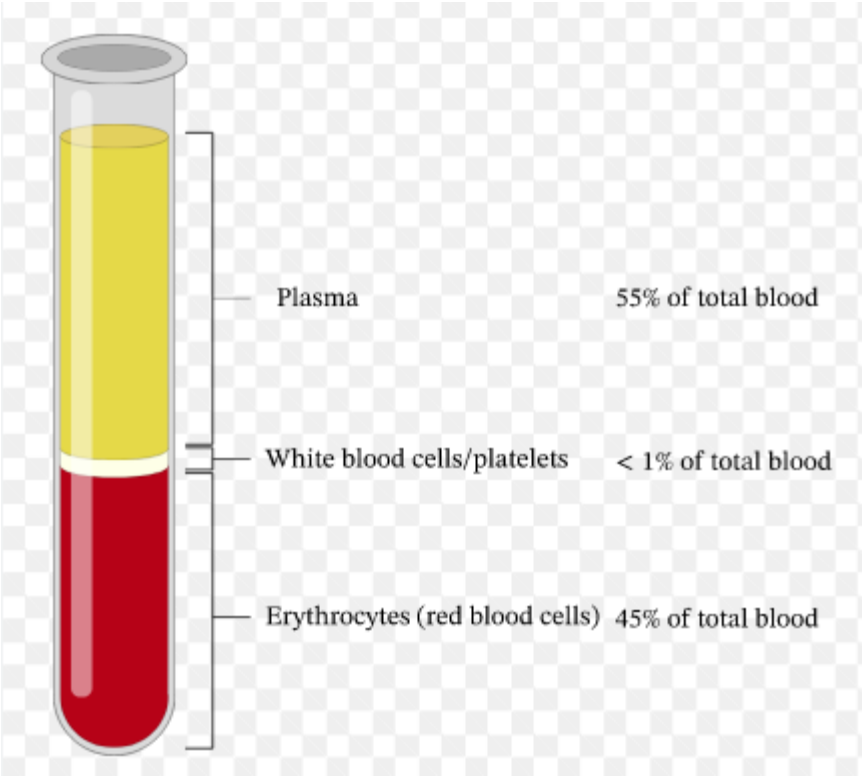
TRANSPORT OF RESPIRATORY GASES

The respiratory gases are $O_2 and\ CO_2$.

Title: document illustrating the constituents (components) of blood.



The components of blood are:

Components	Characteristics
1. Plasma	✓ It is a yellow fluid in which all blood cells are found. ✓ It constitutes 55% of the total blood volume. ✓ It plays a role in the respiratory system (respiration), since O_2 and CO_2 can be carried by the plasma.
2. Leukocytes	✓ They are white blood cells (W.B.C) ✓ They play a role in the immune system. ✓ They constitute less than 1% of the total blood volume.
3. Platelets	✓ They form less than 1% of the total blood volume. ✓ They play a role in blood clotting and healing of wounds.
4. Erythrocytes	✓ They are red blood cells (R.B.C) they constitute 45% of the total ✓ blood volume. ✓ They play a role in respiration. ✓ They contain a very important molecule known as hemoglobin (Hb) which is a red colored protein. ✓ R.B.C don't have a nucleus.

NOTE!!!

- ✓ Each R.B.C contains around 300 million of Hb molecules.
- ✓ Hb is the molecule that gives the R.B.C it's red color.
- ✓ Each molecule of Hb has a property of binding rapidly and in a reversible manner to $O_2 and\ CO_2$.

Reversible reactions:

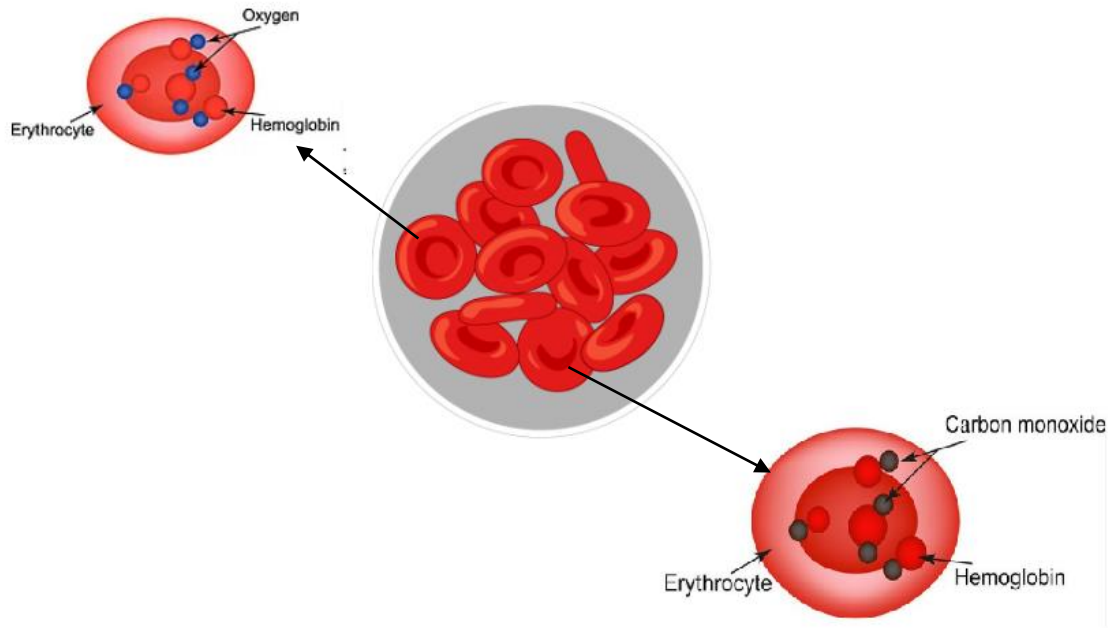
$\rightarrow Hb + O_2 \rightleftharpoons$ oxyhemoglobin

$Hb + 4O_2 \rightleftharpoons HbO_8$

$\rightarrow Hb + CO_2 \rightleftharpoons$ Carbohemoglobin

$Hb + CO_2 \rightleftharpoons HbCO_2$

Title: Red Blood Cells



O_2 *and* CO_2 gases can bind or fix on Hb molecule found inside R.B.C in a reversible manner.

NOTE!!!

Transport of oxygen by blood:

→The constituents of blood which transport O_2 are Hb and plasma.

→O_2 is carried in blood by 2 forms:

- ✓ In the form of oxyhemoglobin (fixed on Hb) 98.5% of oxygen gas is transported by Hb in the form of oxyhemoglobin.
- ✓ A very small quantity of oxygen gas is carried in the dissolved form inside the plasma (1.5%).

Transport of Carbon dioxide by blood:

→The constituents of blood which transport O_2 are Hb and plasma.

→CO_2 is carried in blood by 3 different forms:

- ✓ In the form of carbohemoglobin (fixed on Hb) 20→30 % of CO_2 gas is transported by Hb in the form of carbohemoglobin.
- ✓ In the form of bicarbonate (HCO_3) found in plasma (60 →70%).
- ✓ In the dissolved form (in the plasma) 7 →10 %.

REMARK!!!

At the level of the tissues(dark red color)

✓ Medium rich in CO_2.

$Hb + CO_2 \rightleftharpoons HbCO_2$.

✓ Medium poor in O_2.

$HbO_8 \longrightarrow Hb + 4O_2$

At the level of the lungs (bright red color)

✓ Medium poor in CO_2.

$HbCO_2 \longrightarrow Hb + CO_2$

✓ Medium rich in O_2.

$Hb + 4O_2 \rightleftharpoons HbO_8$

Title: table of comparison between healthy person and asthmatic person.

Healthy person	Asthmatic person
1. Wide bronchiole	Constricted bronchiole
2. Thin wall of bronchiole.	Thick wall of bronchiole.
3. Small amount of mucus.	Large amount of mucus.
4. Wide pathway of air.	Narrow pathway of air.
5. Normal size of alveolar sac.	Bigger size of alveolar sac.

NOTE!!!

Carbon monoxide is a colorless, tasteless, and odorless gas. It is known as a silent killer. It will bind or fix on Hb molecules in an irreversible manner. As a result, O_2will not be able to bind on Hb molecules. So the amount of O_2 transported by Hb (oxyhemoglobin) will increase leading to respiratory problems.