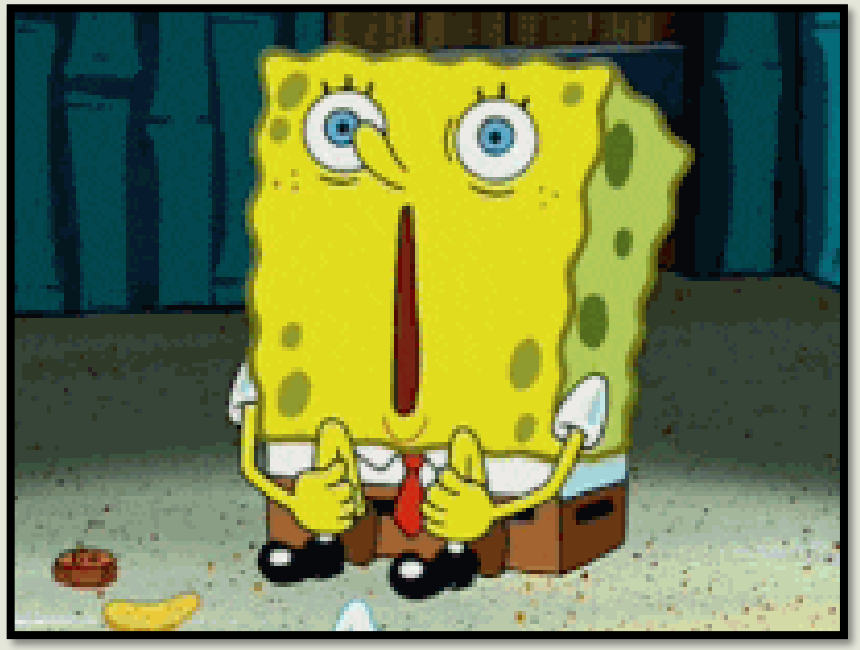


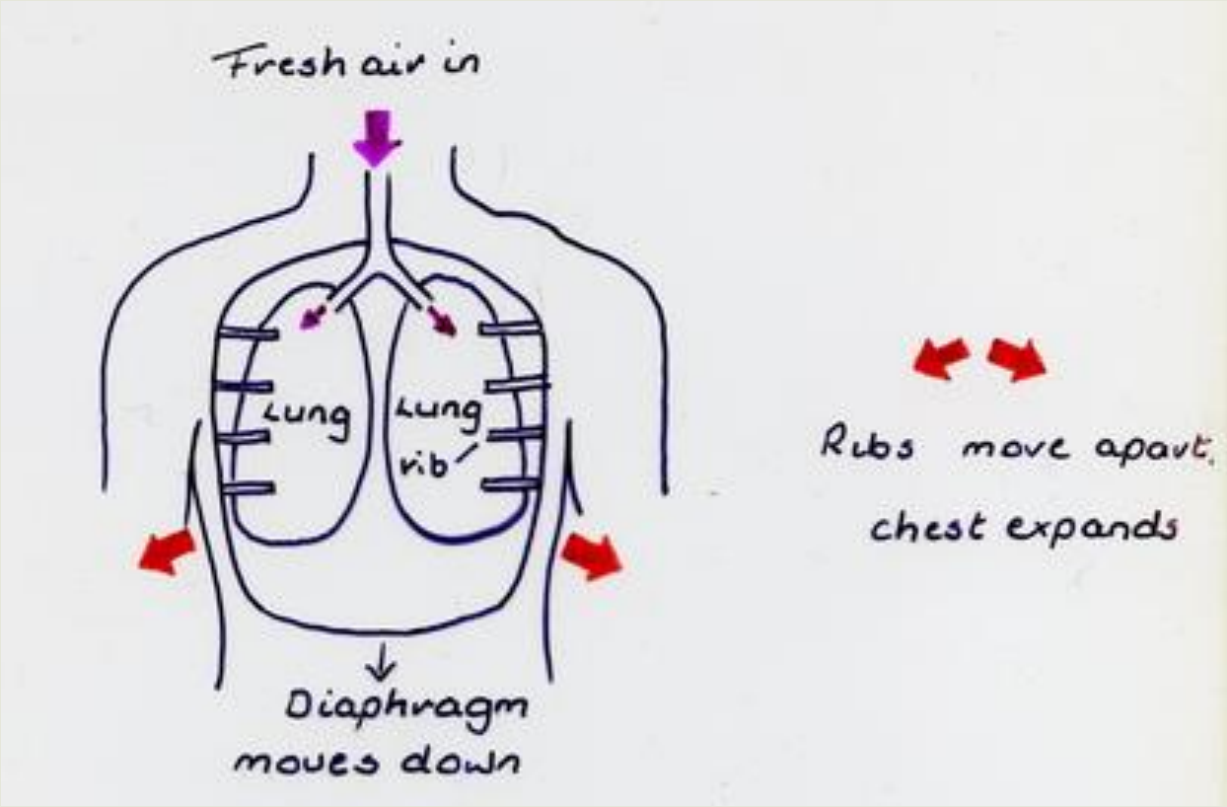
Mechanics of Breathing

Mechanics of Breathing

- How does breathing work?
- How does air enter the lungs?

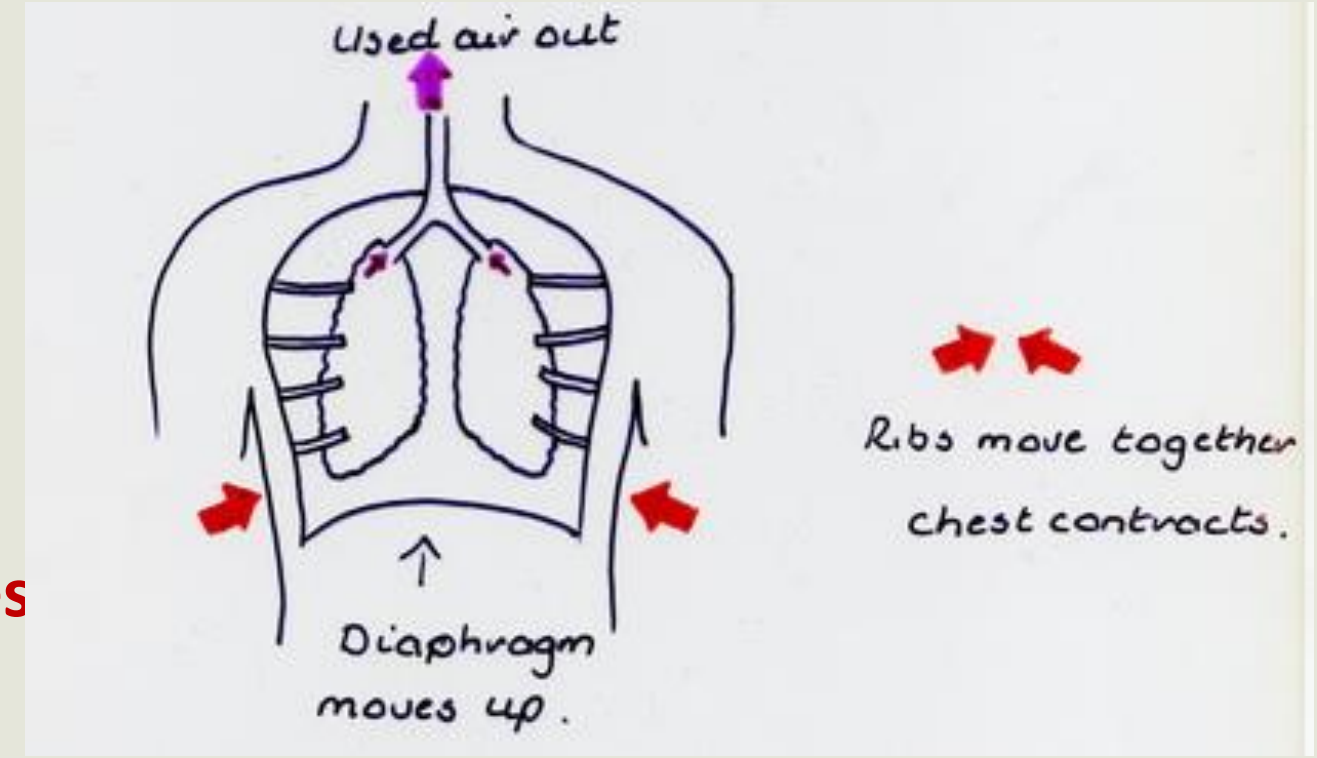
Mechanics of Breathing

- **Inhalation:**
  - **Intercostal** muscles contract
    - Ribs go **up and out**
  - **Diaphragm** contracts
    - Diaphragm goes **down**
  - **Volume** of lungs **increases**
    - **Pressure** inside lungs **decreases**
  - Air rushes **in**

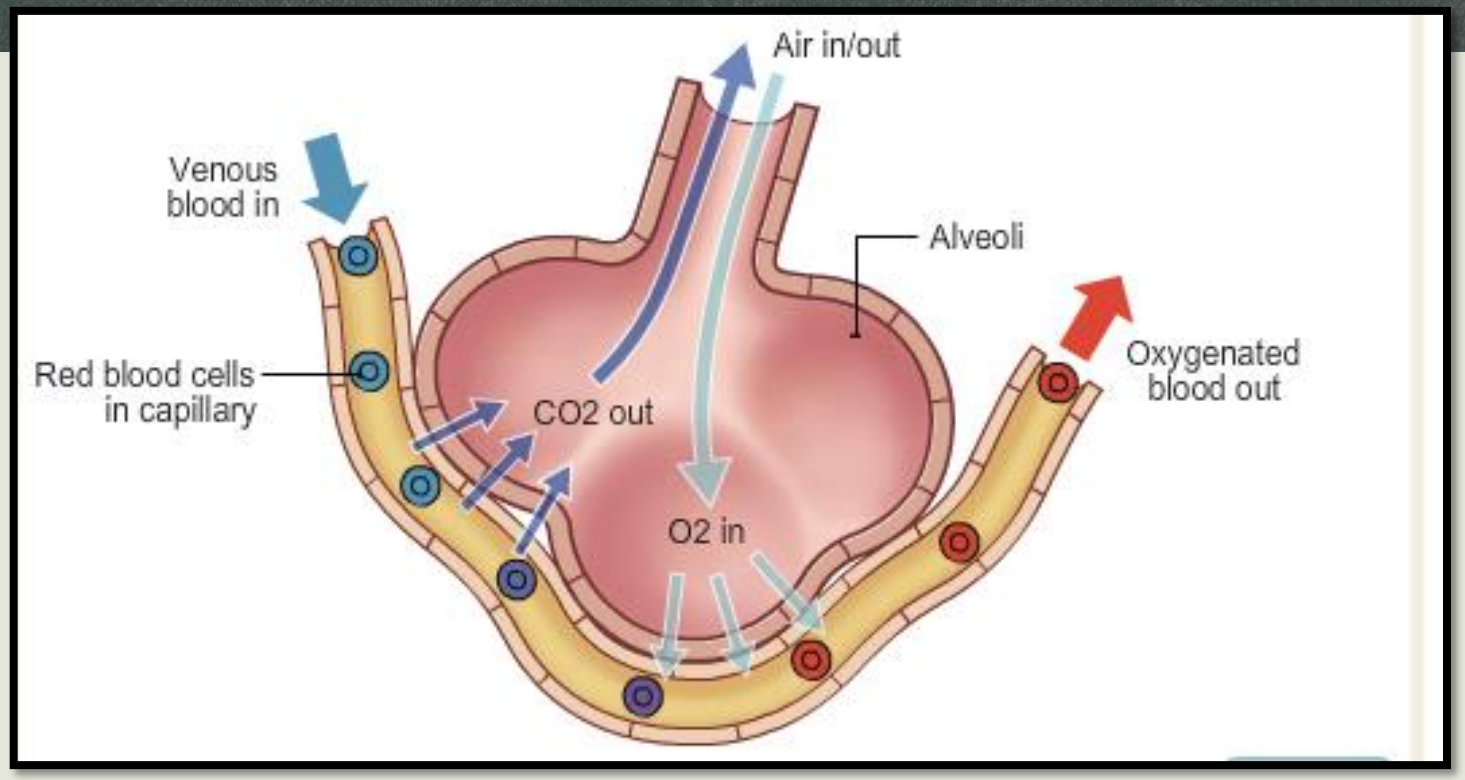


Mechanics of Breathing

- **Exhalation:**
  - **Intercostal** muscles **relax**
    - Ribs go **down and in**
  - **Diaphragm** relaxes
    - Diaphragm goes **up**
  - **Volume** of lungs **decreases**
    - **Pressure** inside lungs **increases**
  - Air rushes **out**



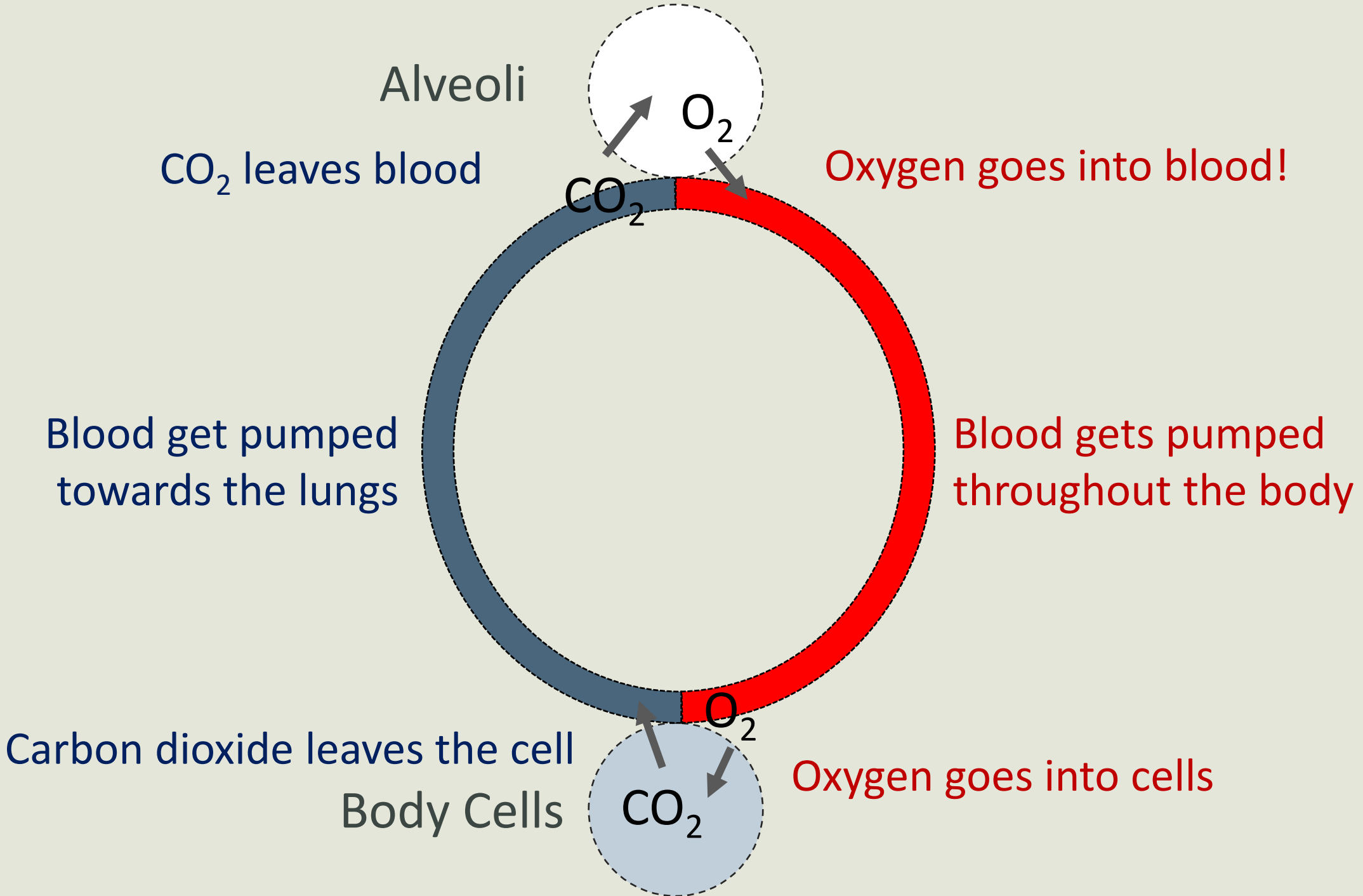
Diffusion



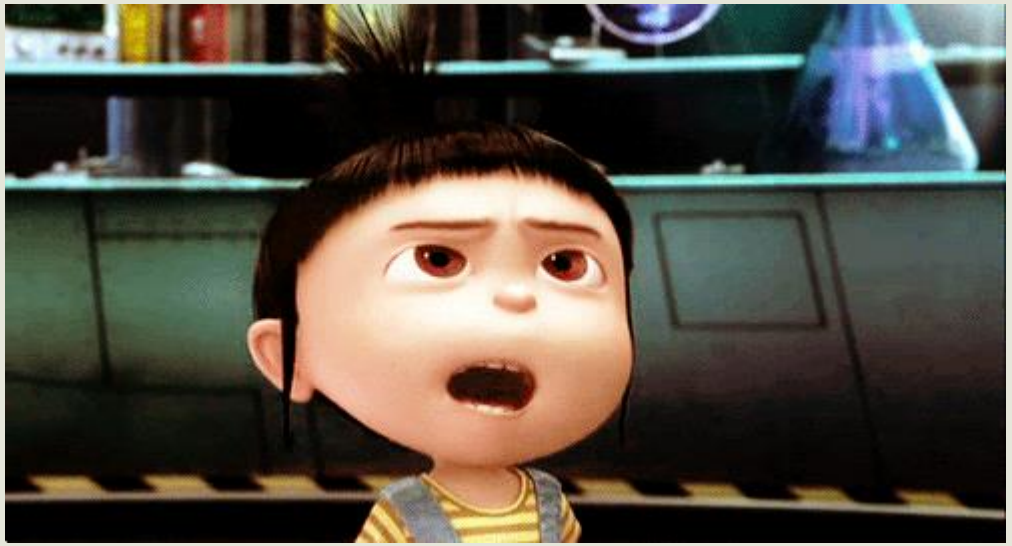
- During diffusion:
  - **Oxygen** moves **into** the blood and **carbon dioxide** moves **out** of the blood.

Respiratory System

- During diffusion:
  - **Oxygen** moves **into** the blood and **carbon dioxide** moves **out** of the blood.
- The blood then carries the oxygen to the cells
  - **Oxygen** moves **out** of the blood (into the cells) and **carbon dioxide** moves **into** the blood (out of the cells).
    - **Carbon dioxide** is brought back to the **lungs**


Alveoli
O_2
CO_2 leaves blood
CO_2
Oxygen goes into blood!
Blood get pumped towards the lungs
Blood gets pumped throughout the body
O_2
Carbon dioxide leaves the cell
Oxygen goes into cells
Body Cells
CO_2

Do we use all the air we breathe in?



Nope!

Composition of Air

- The air we **breathe in** is a mixture of gases:
  - Nitrogen (N) 78%
  - Oxygen (O_2) 21%
  - Carbon Dioxide 0.04%
  - Other gases < 1%

Mechanics of Breathing

- The air we **breathe out** is also a mixture of gases:
  - Nitrogen 78%
  - Oxygen 16%
  - Carbon Dioxide 5%
  - Other <1%

Exhaled carbon dioxide is **higher** because of **waste collected from cells (5%)**

Exhaled oxygen is **lower** because **some of it diffuses into the bloodstream to be used for cellular respiration**

Mechanics of Breathing

- The air we **breathe out** is also a mixture of gases:
  - Nitrogen 78%
  - Oxygen 16%
  - Carbon Dioxide 5%
  - Other <1%

Why don't the concentration of nitrogen and "other" gases change?

We don't use them!