

# 10.1 The Need for the Respiratory System

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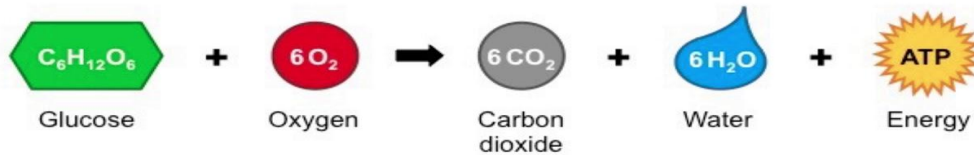
Question:

Each day we take between \_\_\_\_\_ and \_\_\_\_\_ breaths each day

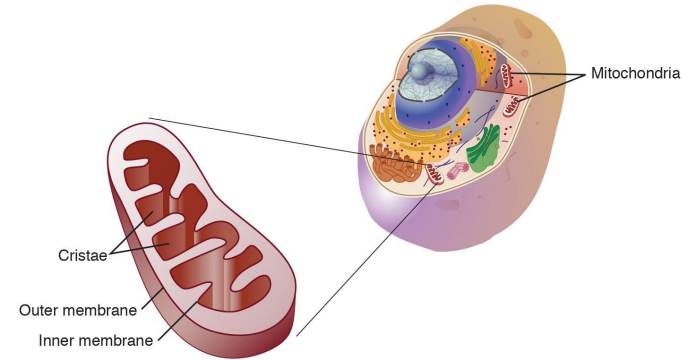
- A. 5000 - 10,000
- B. 15,000 - 30,000
- C. 40,000 - 50,000

# The Need for Oxygen

- Plants and animals require **oxygen** to obtain energy from **food**
  - **Aerobic Cellular Respiration** – series of chemical reactions that occur in the **mitochondria** of cells that require oxygen to produce energy.

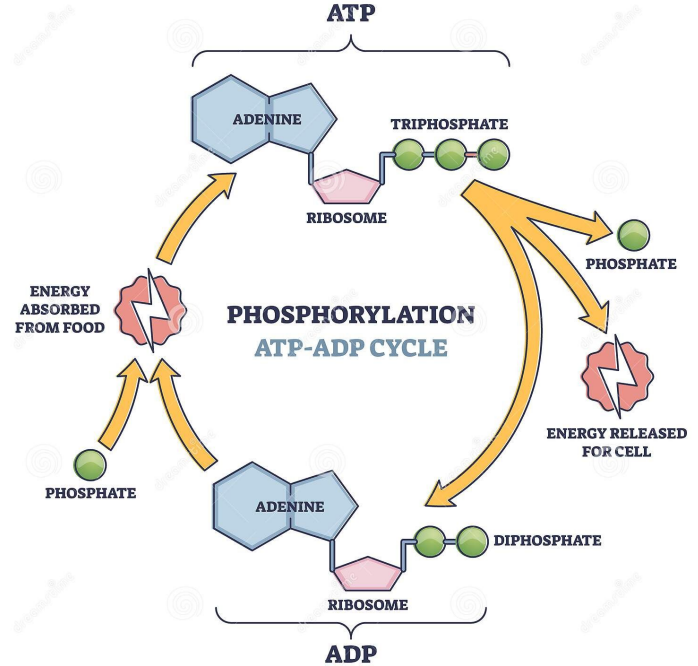


- 64% of the **energy** released is **thermal** energy  
→ used to maintain body temperature
- 36% is stored as **ATP** (adenosine triphosphate).



# The Need for Oxygen

- ATP is formed when **energy** from the **breakdown of glucose** is used to attach a **phosphate** (Pi) group onto a molecule called **ADP** (adenosine diphosphate).
  - This process is called **phosphorylation**.



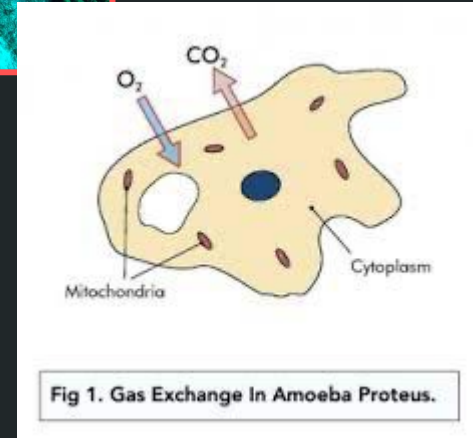
- **Expanded formula** for cellular respiration:



How Does Oxygen  
get to Body Cells so  
that Cellular  
Respiration can  
Occur?

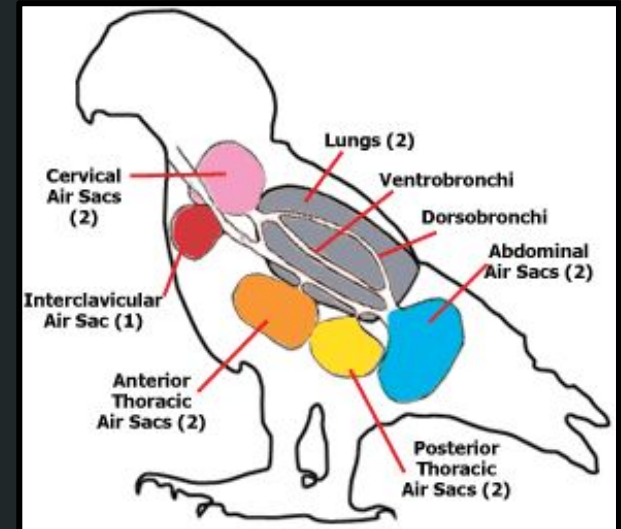
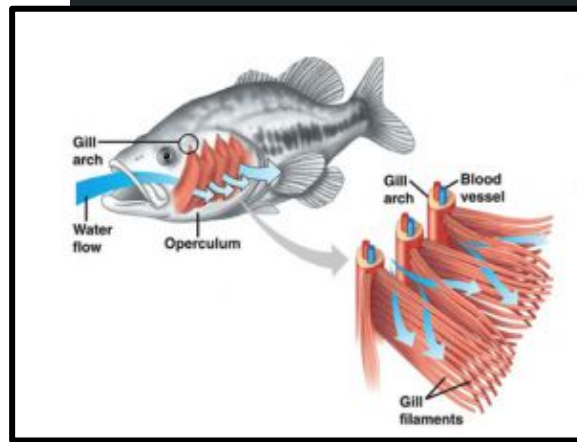
# Simple Organisms

Oxygen moves from the surrounding environment through the cell membrane into cells through **diffusion**.

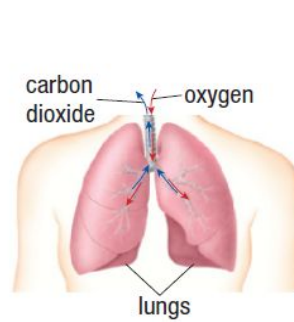
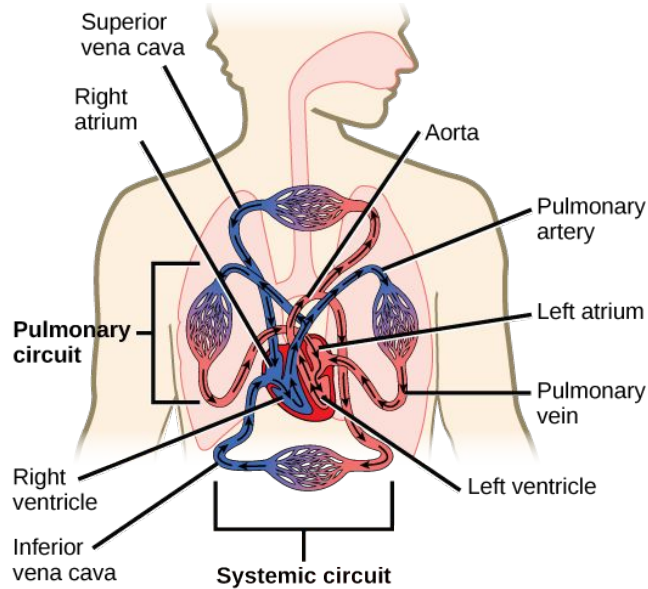


# Complex Organisms

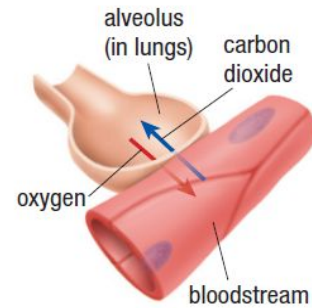
Complex organisms have special **organ systems** that supply oxygen to all parts of the body.  
Also requires diffusion.



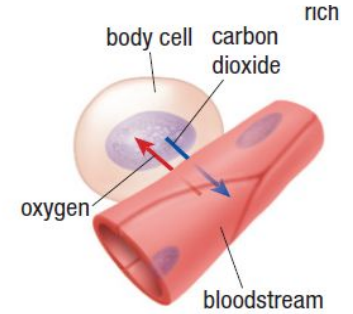
# Gas Exchange and Ventilation



(a)



(b)



(c)

- Ventilation** – Moves oxygen-rich air to the lungs and carbon dioxide-rich air away from the lungs
- Gas Exchange (at alveolus)** – Oxygen into blood, carbon dioxide out of blood
- Gas Exchange (at body cell)** – Oxygen out of blood into cells, carbon dioxide out of cells into blood

## 10.1 Summary

- All plants and animals require oxygen for aerobic cellular respiration.
- Aerobic cellular respiration is a series of chemical reactions that use oxygen to obtain energy from food molecules. The waste products of aerobic cellular respiration are water and carbon dioxide.
- Ventilation brings a continuous supply of air to the lungs.
- Gas exchange by diffusion occurs at two locations: the lungs and the body cells. In the lungs, oxygen diffuses into the bloodstream and carbon dioxide diffuses out of the bloodstream. At each body cell, oxygen diffuses from the bloodstream into the cell and carbon dioxide diffuses from the cell into the bloodstream.