

## Chapter Four: The Cell in Action

### Section 2: Cell Energy

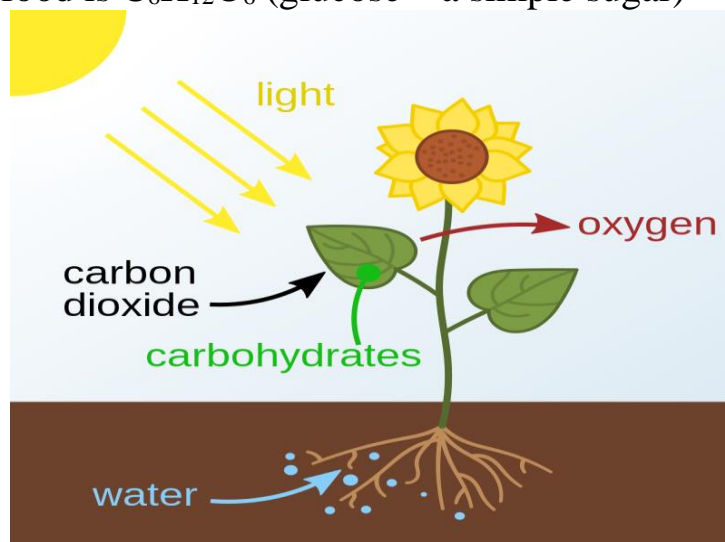
All cells need energy to live, grow, and reproduce.

- Plant cells get their energy from the sun.
- Animal cells get their energy from food.

**Photosynthesis:** the process by which plants, algae, and some bacteria use energy from the sun and change it into food

**Chlorophyll:** the main pigment used in photosynthesis that gives plants their green color

- It is found in chloroplasts
- $6 \text{ CO}_2 + 6 \text{ H}_2\text{O} + \text{Light Energy} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ O}_2$
- Plants food is  $\text{C}_6\text{H}_{12}\text{O}_6$  (glucose – a simple sugar)

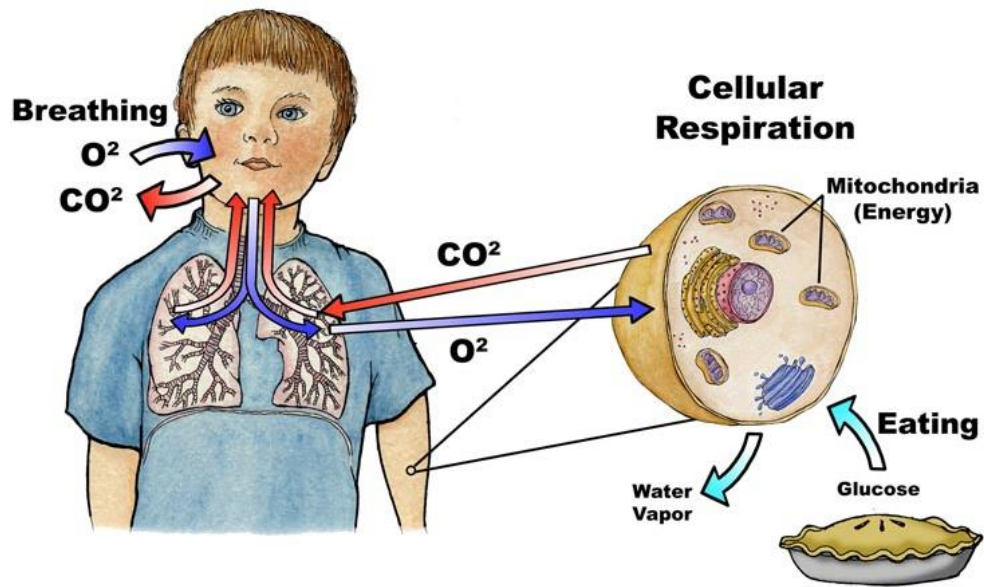


Food for Animal Cells

**Cellular Respiration:** the process by which cells use oxygen ( $\text{O}_2$ ) to produce energy from food

- $\text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ O}_2 \rightarrow 6 \text{ CO}_2 + 6 \text{ H}_2\text{O} + \text{Energy}$
- Food is broken down into  $\text{CO}_2$  and  $\text{H}_2\text{O}$  and energy is released
- Energy released maintains body temperature and some is used to form ATP that supplies energy that fuels cell activities

- For prokaryotic cells...takes place in the cell membrane
- For eukaryotic cells...takes place in mitochondria



### Connection between photosynthesis and cellular respiration

- The two processes are opposites of each other.
- Photosynthesis uses  $CO_2$  and releases  $O_2$
- Cellular respiration uses  $O_2$  to break down glucose and release energy and  $CO_2$

### **Fermentation:** the breakdown of food without the use of oxygen

- Muscles...produces lactic acid (causes muscle fatigue)
- Yeasts...forms carbon dioxide ( $CO_2$ ) and causes the dough to rise and leave small holes in the bread