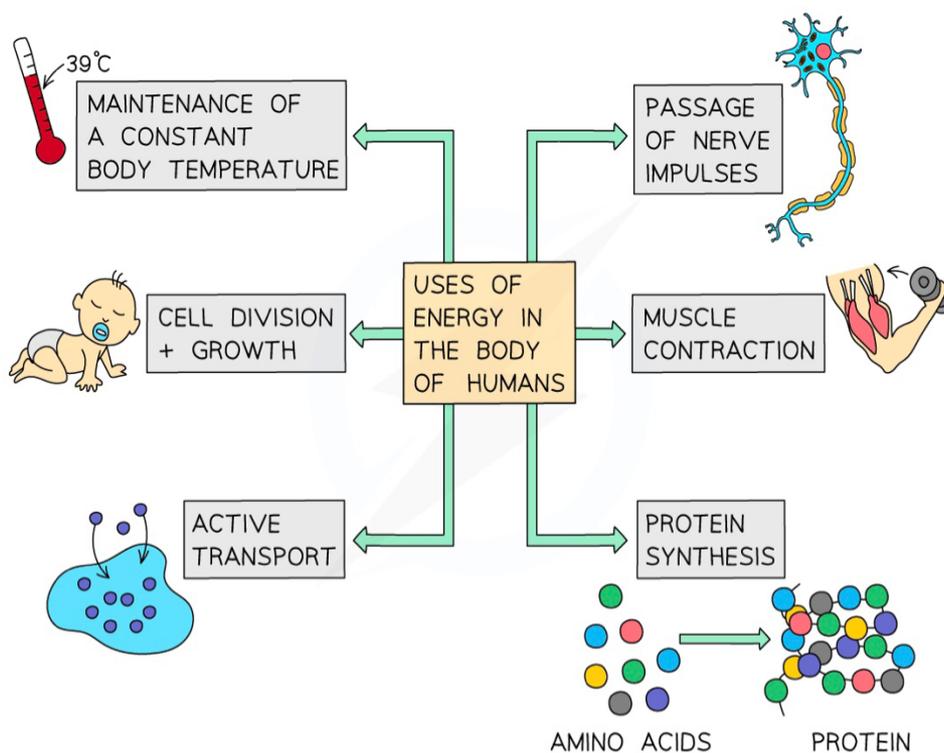


Respiration

What is Respiration

- Respiration is the process by which all living cells continuously release energy from glucose.
- Animals get their glucose from digested food, plants make their own glucose in photosynthesis.
- Respiration is an exothermic reaction because it releases energy.
- Energy is required for many living processes:
 - **To build large molecules** from smaller ones, e.g. proteins from amino acids, starch and cellulose from glucose.
 - **To provide movement** by contracting their muscles.
 - **To maintain a warm body temperature** that is suitable for enzymes to work efficiently.



- Organism respire aerobically when Oxygen is present—> Aerobic Respiration
- Organism also respire when oxygen is lacking —> Anaerobic Respiration

Aerobic Respiration

- ▶ When cells receive sufficient oxygen, they will respire aerobically.
- ▶ Glucose and oxygen are converted into carbon dioxide and water, which releases energy.
- ▶ **Word equation:**



- ▶ **Chemical equation:**



- ▶ Aerobic respiration takes place in the mitochondria.

Anaerobic Respiration

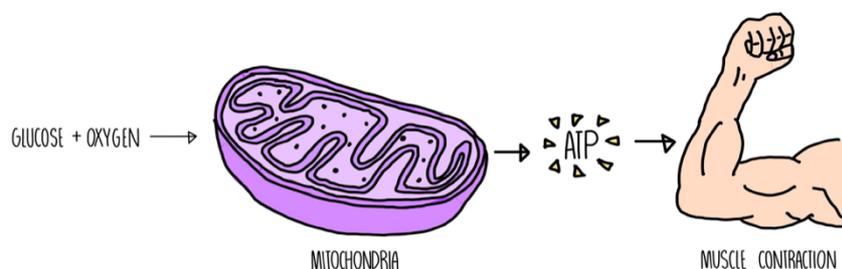
- ▶ When cells do not receive enough oxygen, they respire anaerobically (without oxygen).
- ▶ The glucose is not fully oxidised so it is much less efficient than aerobic respiration and makes different products.

1- Animals

- ▶ In animals, glucose is broken down into lactic acid if there is no oxygen.



- ▶ It occurs in muscle cells during vigorous exercise as the body cannot supply them with enough oxygen.



2- Plants and Yeast

- In plants and yeast cells, glucose is broken down into ethanol and carbon dioxide.



- Anaerobic respiration in yeast cells is called **fermentation**. It is a very important process in the production of food and drinks:
- Ethanol produced from fermentation is a type of alcohol which is used to make beers, wines and other alcoholic drinks.
 - Carbon dioxide produced from fermentation is used to make bread rise.

Difference between Aerobic and Anaerobic Respiration :

S.No.	Aerobic	Anaerobic
1	It occurs in all living cells of higher plants.	It occurs in bacteria, certain fungi, germinating seeds and fleshy fruits, muscles.
2	It requires oxygen.	Oxygen is not required.
3	The end products are CO ₂ and H ₂ O.	The end products are alcohol and CO ₂ or lactic acid.
4	The oxidation of one molecule of glucose produces 38 ATP molecules.	The number of ATP molecules produced is only 2.
5	All the reactions except the reactions of glycolysis take place inside mitochondria.	All the reactions take place in cytoplasm.
6	Organic compounds are completely oxidised & high amount of energy is released.	Organic compounds are incompletely oxidised and very small amount of energy is released.
7	Non toxic to organisms.	Toxic to higher organisms.

