

Overview of Cellular Respiration

In symbols:



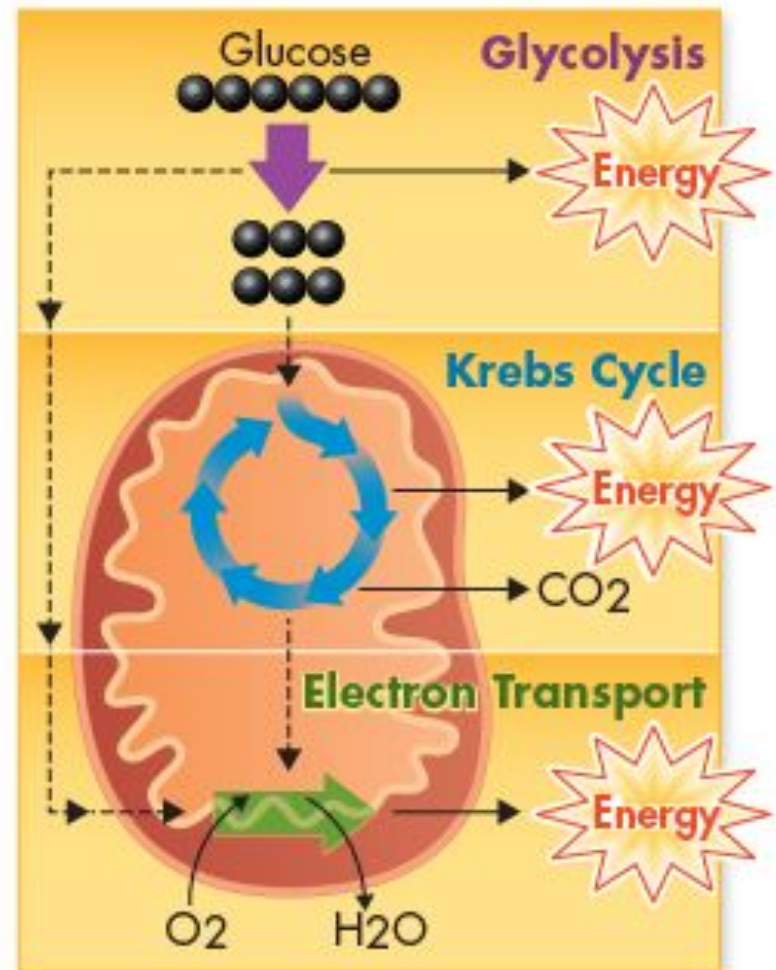
In words:

Oxygen + Glucose → **Carbon dioxide + Water + ATP + Heat**

Stages of Cellular Respiration

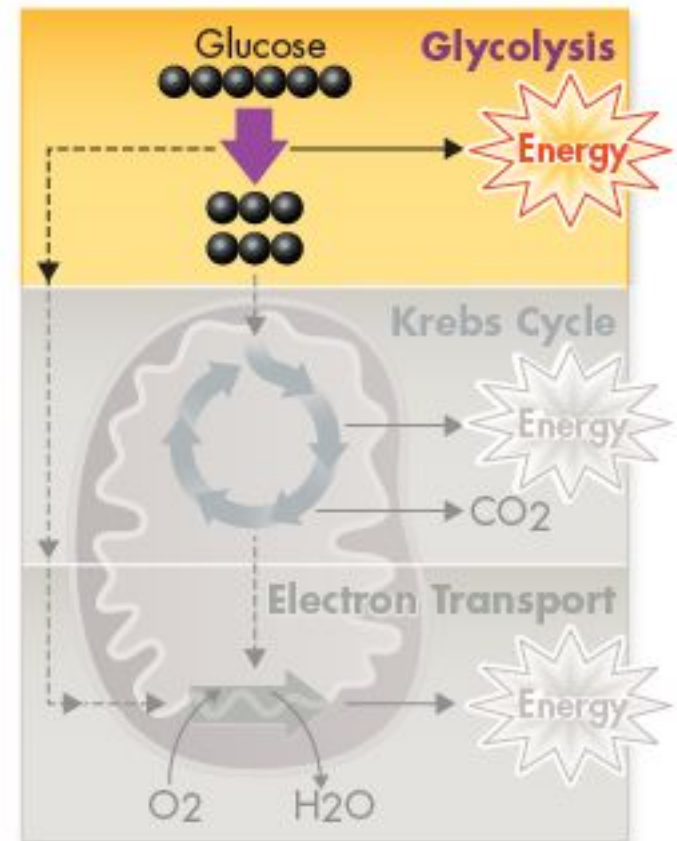
- Cellular respiration captures the energy from food in three main stages:

- ✓ **Glycolysis**
- ✓ **The Krebs cycle**
- ✓ **The electron transport chain**



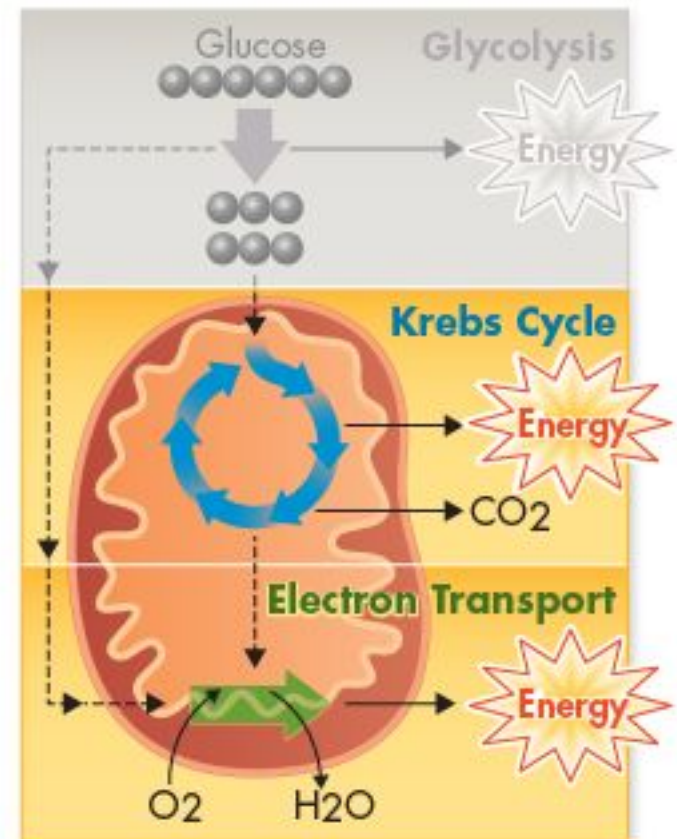
Anaerobic vs. Aerobic Pathways

- Anaerobic pathways are processes that occur **without oxygen**.
- ✓ **Glycolysis** is an anaerobic pathway.
- ✓ Glycolysis takes place in the **cytoplasm** of the cell.



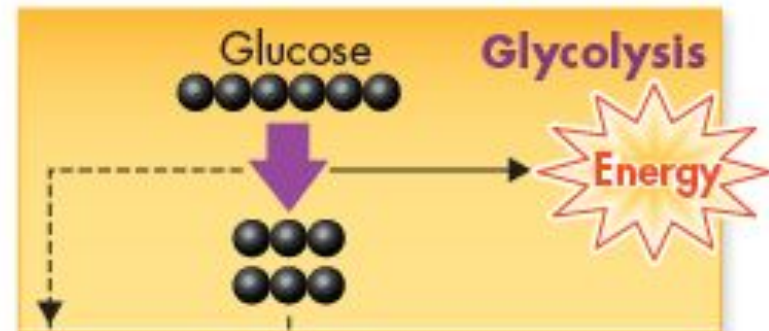
Anaerobic vs. Aerobic Pathways

- Aerobic pathways are processes that **require oxygen**.
- ✓ The **Krebs cycle** and **electron transport chain** are both aerobic pathways.
- ✓ Both take place inside the **mitochondria**.



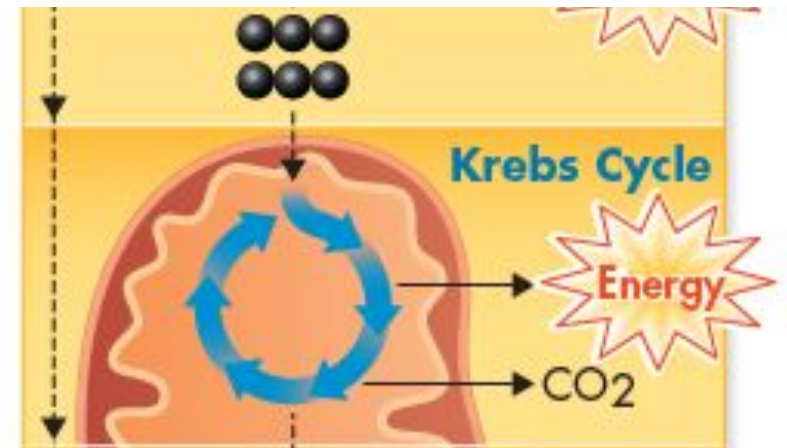
Glycolysis

- **1 molecule of glucose** (a 6-carbon compound) is transformed into **2 molecules of pyruvic acid** (a 3-carbon compound)
- As the bonds are broken, **energy** is released
- Small amounts of **ATP** are produced to provide energy for the cell
- Occurs in the **cytoplasm**



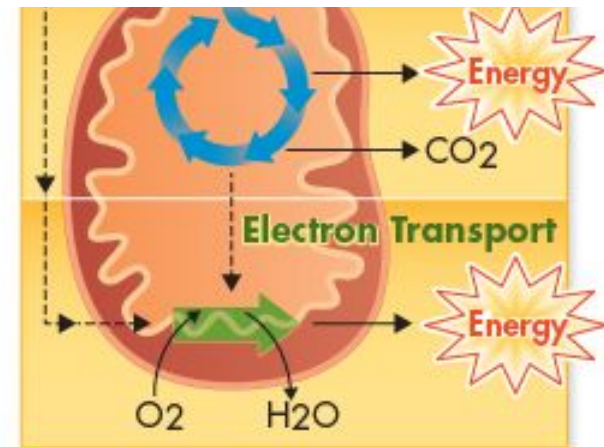
The Krebs Cycle

- **2 molecules of pyruvic acid** are broken down into **carbon dioxide**
- **ATP** is also produced to provide energy for the cell
- Occurs in the **mitochondria**



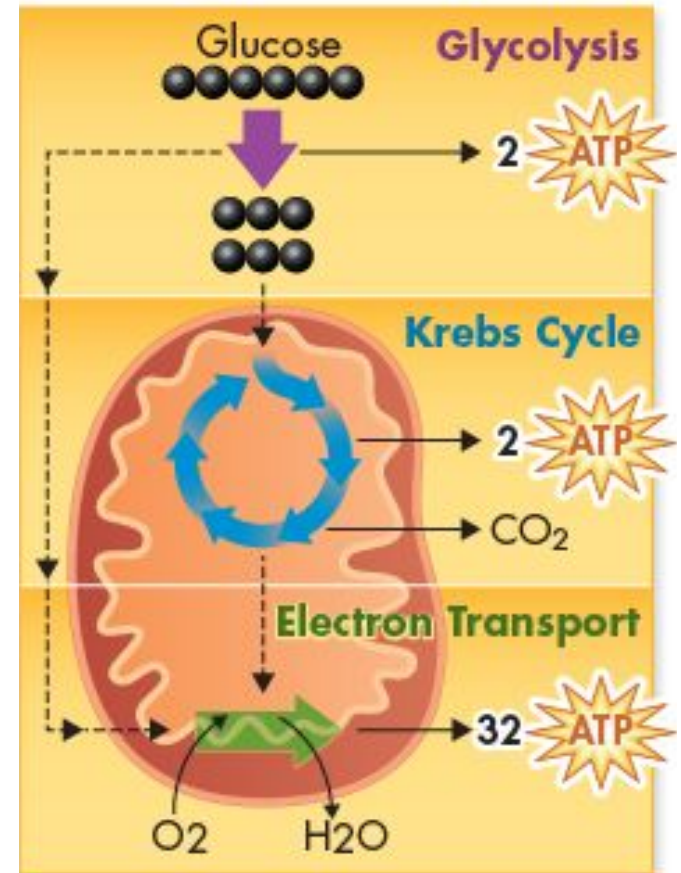
The Electron Transport Chain

- **High-energy electrons** from glycolysis and the Krebs cycle are used to convert **ADP to ATP**
- High-energy electrons provide the energy that the cell needs to **attach a phosphate group** to an ADP molecule, making it ATP
- Occurs in the **mitochondria**



Energy Totals

- Together, glycolysis, the Krebs cycle, and the electron transport chain release about **36 molecules of ATP per molecule of glucose**.
- This represents about 36% of the total energy of glucose. The remaining 64% is released as **heat**.



Cellular respiration begins with a pathway called glycolysis, which takes place in the _____ of the cell.



Students, write your response!

Cellular respiration continues in the _____ of the cell with the Krebs cycle and electron transport chain.



Students, write your response!

The _____ pathways of cellular respiration that require oxygen are the Krebs cycle and the electron transport chain.



Students, write your response!

The _____ pathway of cellular respiration that does NOT require oxygen is glycolysis.



Students, write your response!

Write the overall equation for cellular respiration.



Students, draw anywhere on this slide!

Where do the reactants of cellular respiration come from?



Students, write your response!