

# 9.1 Cellular Respiration: An Overview

# THINK ABOUT IT

You feel weak when you are hungry because food serves as a source of energy.

**How does the food you eat get converted into a usable form of energy for your cells?**



Students, write your response!

# Chemical Energy and Food

- **Chemical energy** is stored in food molecules (ex. glucose).
- Cells can use all sorts of molecules for food, including **lipids**, **proteins**, and **carbohydrates**.
- Energy is **released when chemical bonds in food molecules are broken** (ex. digestive enzyme).

# Overview of Cellular Respiration

- If oxygen is available, organisms can obtain energy from food by a process called **cellular respiration**.

**In symbols:**



**In words:**

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

# Overview of Cellular Respiration

What are the reactants of the cellular respiration reaction?



Students, write your response!

# Overview of Cellular Respiration

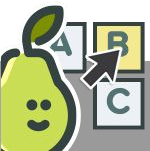
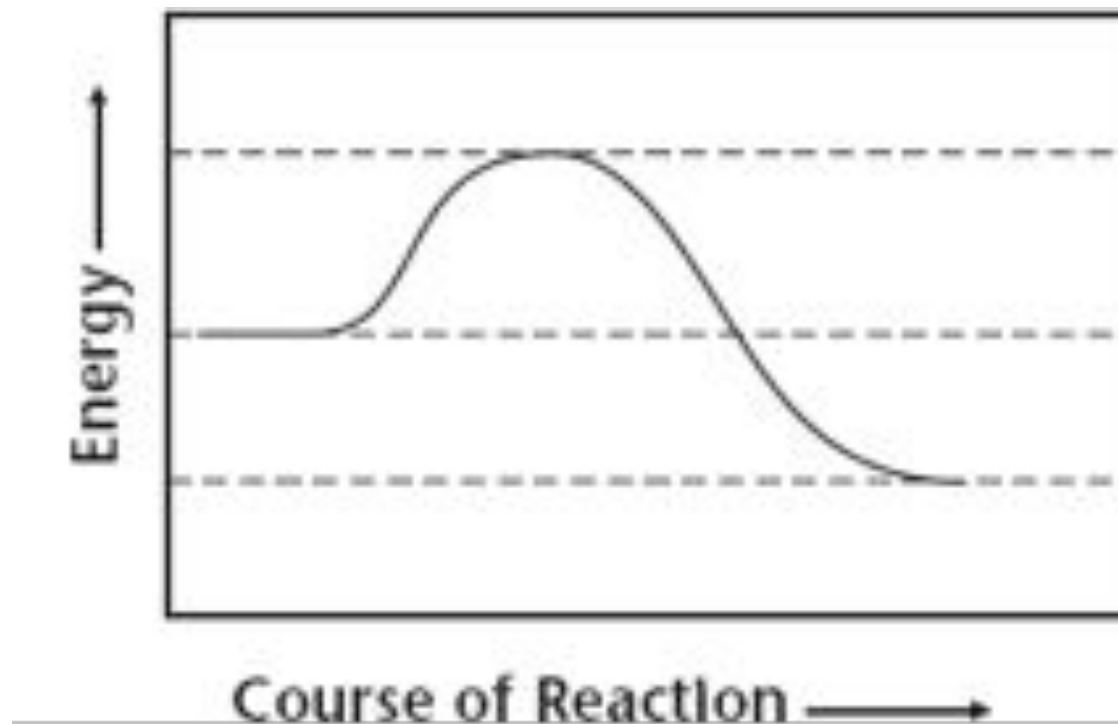
What are the products of the cellular respiration reaction?



Students, write your response!

# Overview of Cellular Respiration

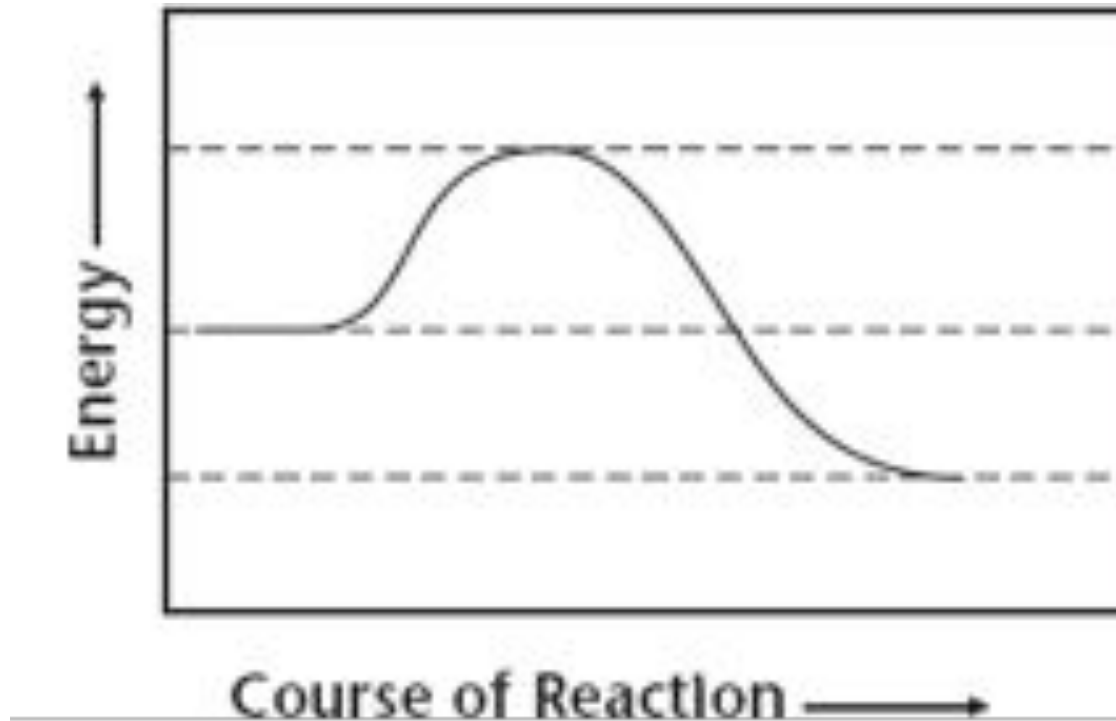
The following diagram represents the cellular respiration reaction. Is this reaction endothermic or exothermic?



Students choose an option

# Overview of Cellular Respiration

- Label the 2 reactants at the appropriate energy level.
- Label the 3 products at the appropriate energy level.

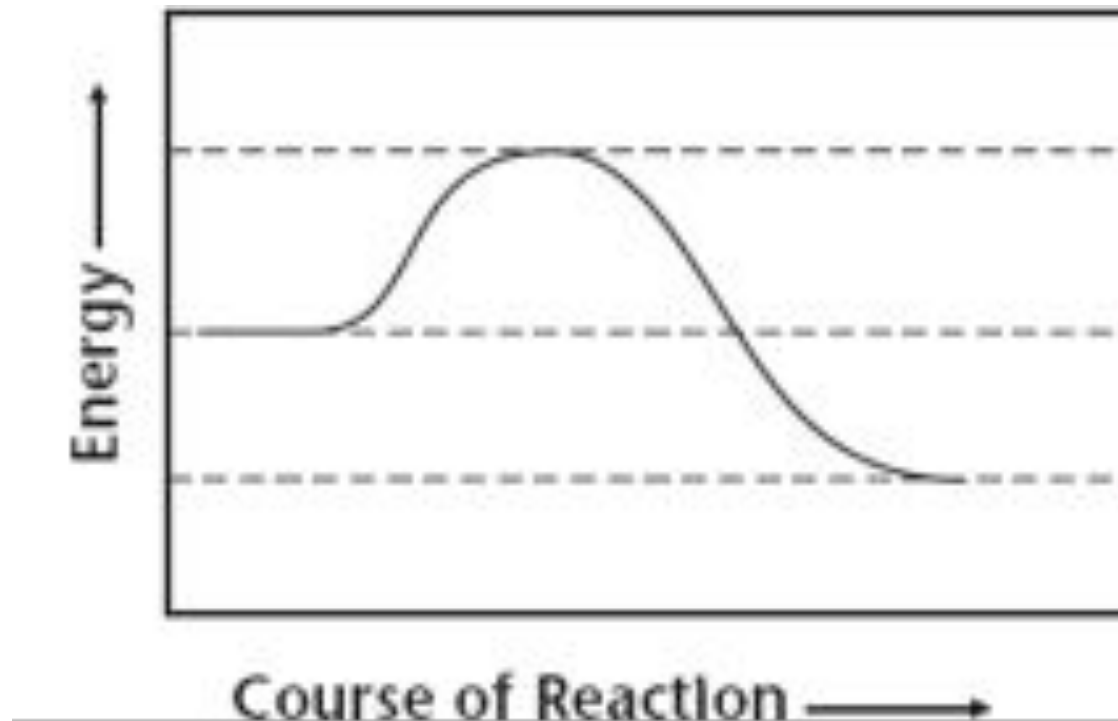


Students, draw anywhere on this slide!



# Overview of Cellular Respiration

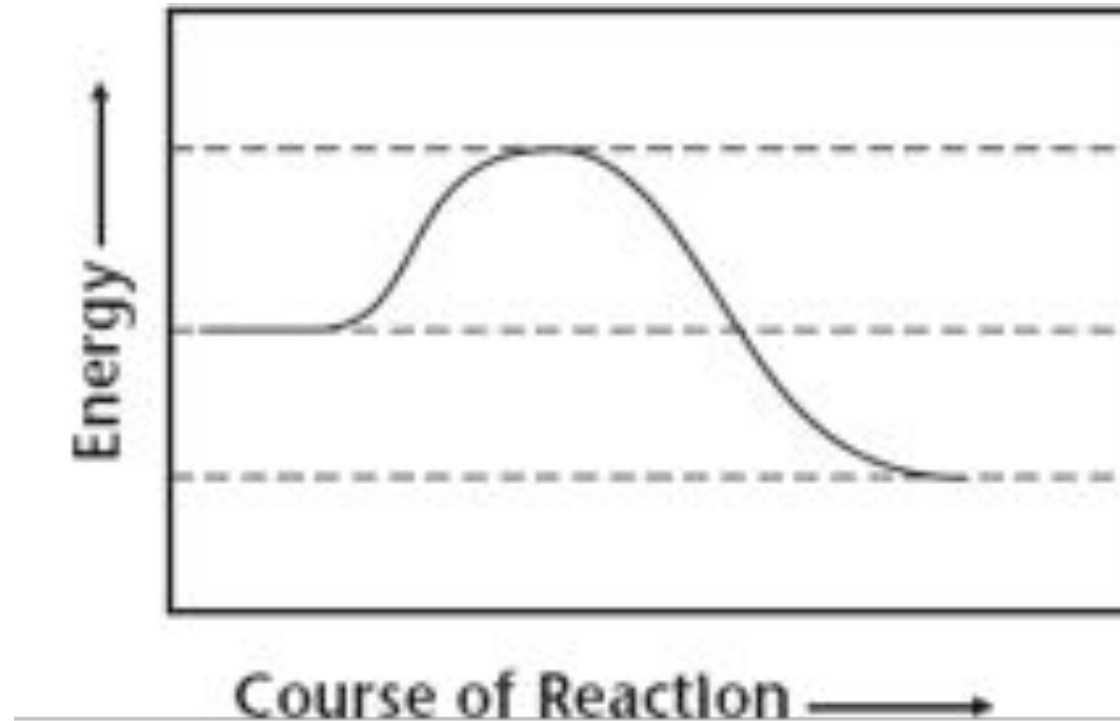
- What happens to the heat that was produced?



Students, write your response!

# Overview of Cellular Respiration

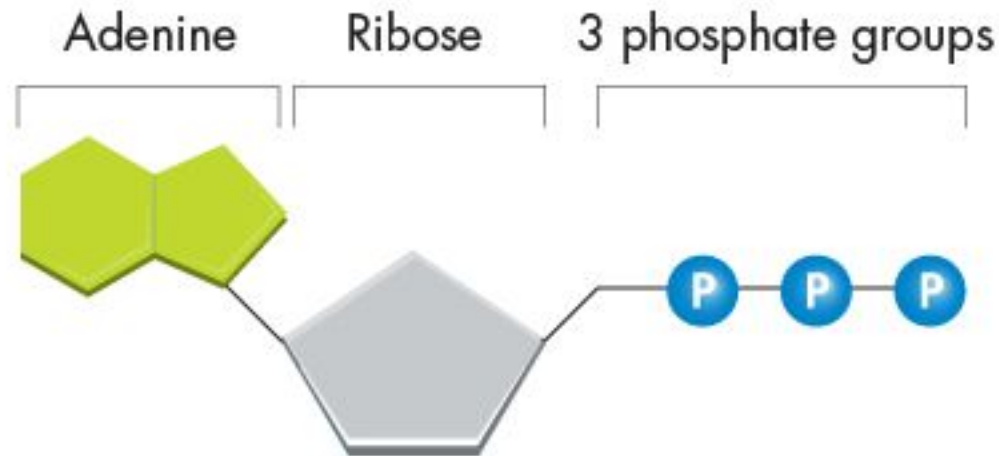
- What is the other energy source produced in cellular respiration?



Students, write your response!

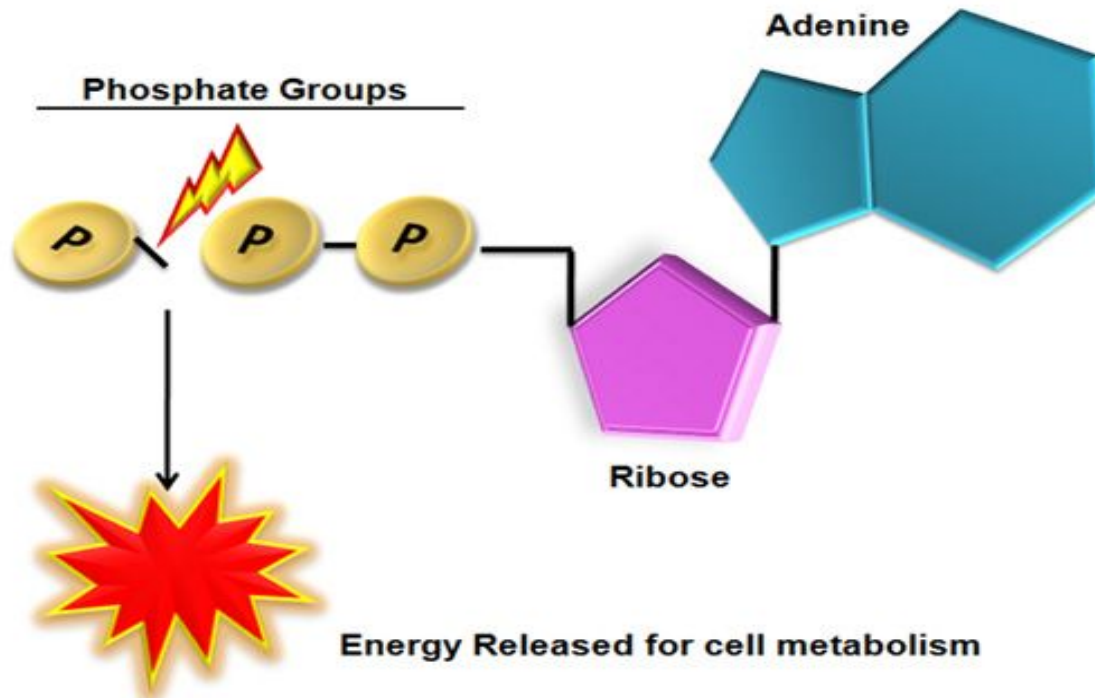
# ATP

- **Adenosine triphosphate (ATP)** is one of the most important compounds that cells use to **store** and **release** energy.
- ATP consists of **adenine**, a **5-carbon sugar** called **ribose**, and **three phosphate groups**.



# ATP: Releasing Energy

- Cells can release the energy stored in ATP by **breaking the bonds between the second and third phosphate groups**.



# Energy Storage

- ATP is NOT a good molecule for **storing large amounts of energy over the long term.**
- It is more efficient for cells to keep only a **small supply** of ATP on hand.
- Cells can regenerate **ATP from ADP** as needed by using the energy in foods like glucose during **cellular respiration.**

# Energy Storage

If our cells are constantly producing heat as a product of cellular respiration, why don't our bodies overheat?

(Hint: Cells are mostly made of water)



Students, write your response!