AP BIOLOGY • HOLIDAY HOMEWORK

# 3 ATP, photosynthesis, and respiration – Part 2

Name: _____ Class: _____ Date: _____

## Vocabulary

*Write each word three times.*

| English | Write it 3 times (English) | | |
|---|---|---|---|
| Photosynthesis | | | |
| Cellular respiration | | | |

## Recall

You already know the two great energy processes of life:

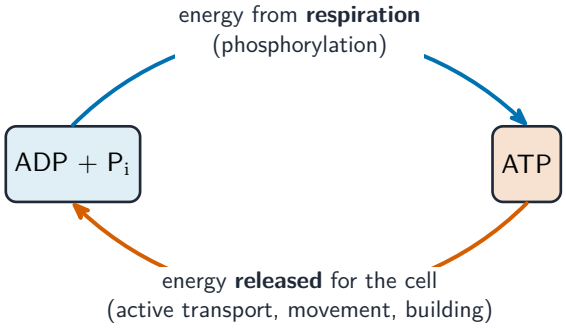
- Plants make food from sunlight – **photosynthesis**.
- All living things release energy from food – **respiration**.
- Your cells need a constant supply of energy to work.

This sheet lines up how cells store and release energy. Each idea has a short worked example.

## New ideas

### ■ 1 ATP – the energy currency

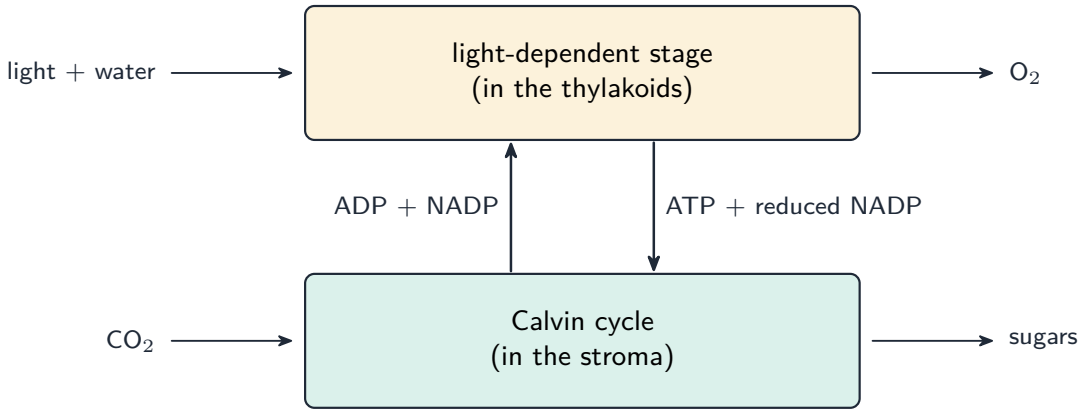
**ATP** is the molecule cells use to carry energy. Breaking off one of its phosphate groups (ATP → ADP) **releases** energy to power the cell's work; adding it back **stores** energy.




## 2 Photosynthesis

**Photosynthesis** captures light energy to build glucose from carbon dioxide and water, releasing oxygen:

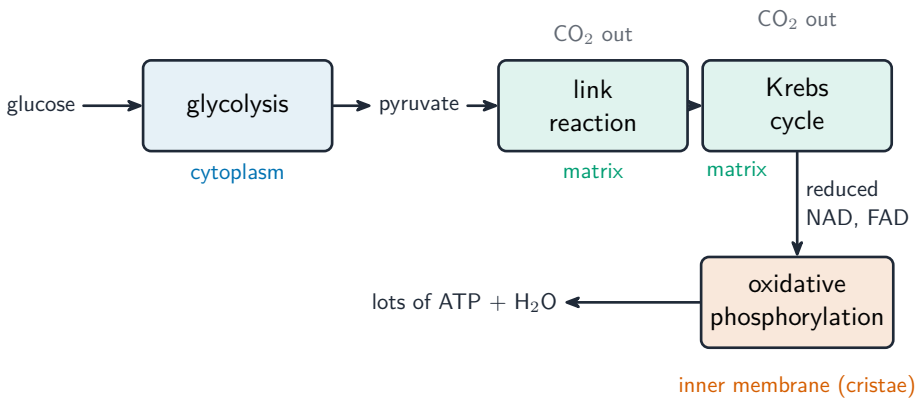
$$CO_2 + \text{water} \xrightarrow{\text{light}} \text{glucose} + O_2.$$




## 3 Cellular respiration

**Cellular respiration** releases the energy stored in glucose to make ATP, usually using oxygen:

$$\text{glucose} + O_2 \to CO_2 + \text{water} + \text{ATP}.$$



### ■ 4 Two sides of one coin

Photosynthesis and respiration are **complementary**: the products of one are the reactants of the other. Plants do both; animals only respire.

**Watch out:** photosynthesis *stores* energy (building glucose) while respiration *releases* it (breaking glucose down). They are opposite processes, not the same thing run twice.

## Practice

Try these in order. The methods are all above.

**2.1** State what happens to energy when ATP is broken down into ADP. [1]

**2.2** Write, in words, the overall equation for photosynthesis. [2]

**2.3** Write, in words, the overall equation for aerobic respiration. [2]

**2.4** State one way photosynthesis and respiration are opposite processes. [2]

**2.5** State which of the two processes an animal cell can carry out. [1]