

Warm Up (10/10-10/11)

1. In your own words, describe the word “energy”.
2. Why do cells need energy?
3. List 3 things a plant needs to grow.

Agenda

- ★ Warm up
- ★ 9.1 and 9.2 Notes: The Need for Energy and Photosynthesis
- ★ Light reaction vs. Calvin cycle table
- ★ Calvin cycle diagram

Homework: 9.1 and 9.2 worksheet,
Mitosis lab (BOTH DUE FRIDAY)

9.1 and 9.2

The Need for Energy

&

Photosynthesis

Photo – light

Synthesis- to make

To make food using light

The Need for Energy

- * **Energy is needed for a number of processes:**

- Active Transport
- Cell Division
- Making, Transporting, & Storing Proteins
- To Move Your Muscles...

- * **What is stored energy?**

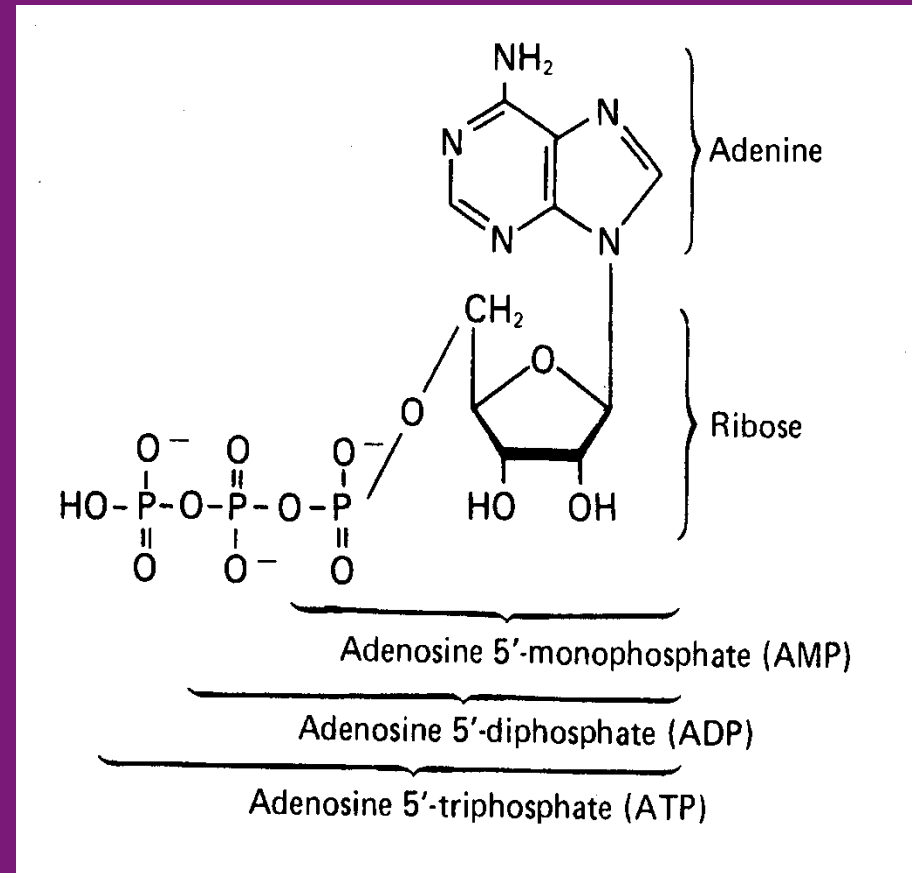
- Examples:
 - * Batteries
 - * Springs



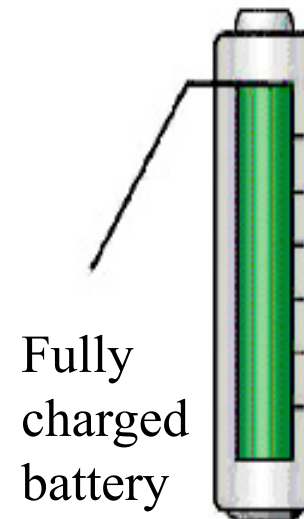
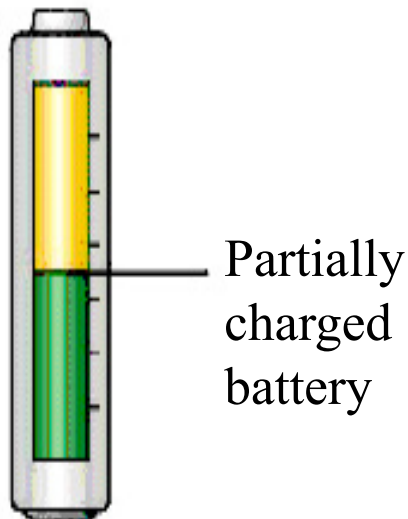
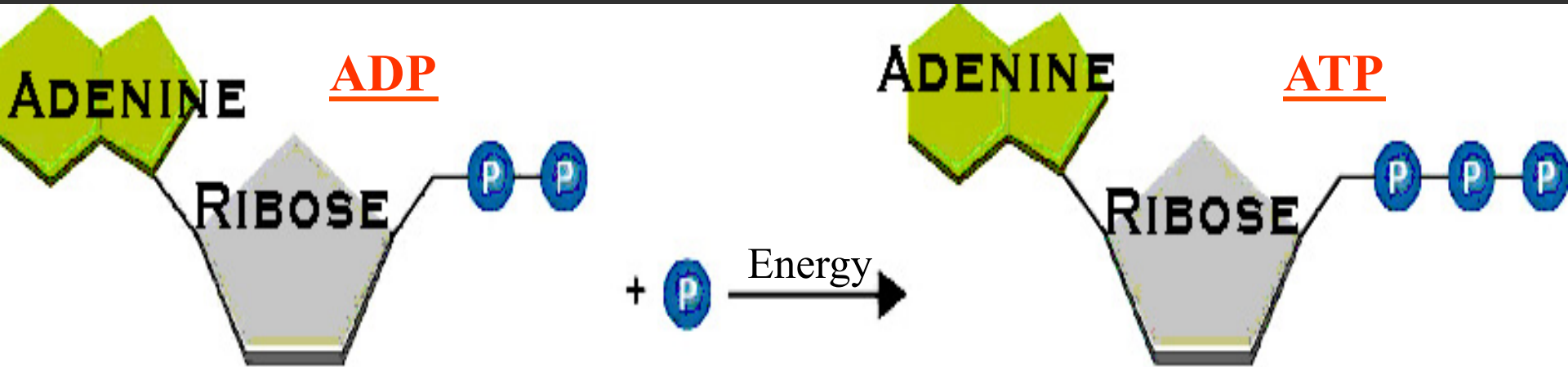
How do cells and organisms use energy?

What is ATP?

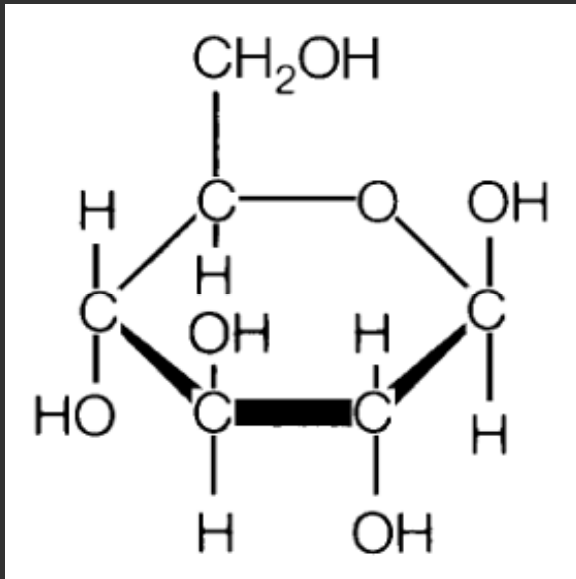
- Adenosine Triphosphate
 - 5-Carbon sugar (Ribose)
 - Nitrogenous base (Adenine)
 - 3 Phosphate groups
- Energy currency of the cell
- The chemical bonds that link the phosphate groups together are high energy bonds
- When a phosphate group is removed to form ADP and P, small packets of energy are released



ADP & ATP



NADPH is another energy molecule. **ENERGY** is stored in the bonds like **ATP**.



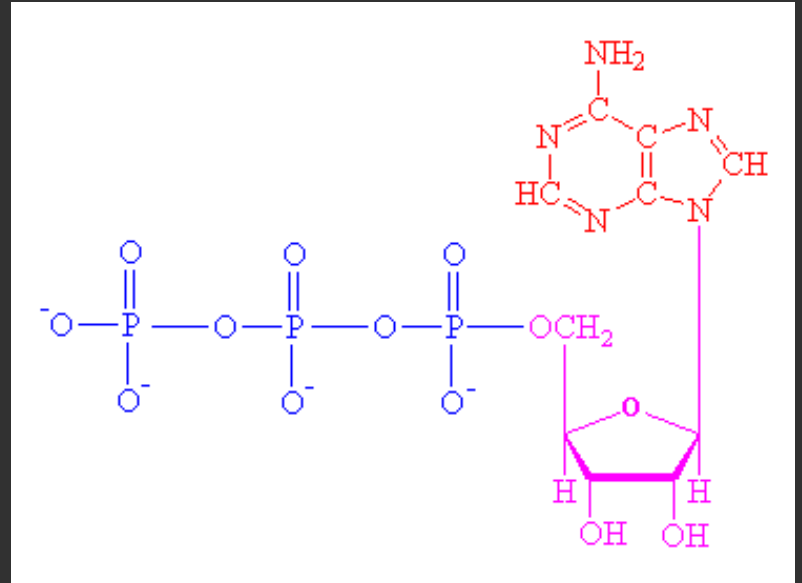
<---Sugar molecules like this store a huge amount of energy

• A \$1000 bill stores a huge amount of money ----->



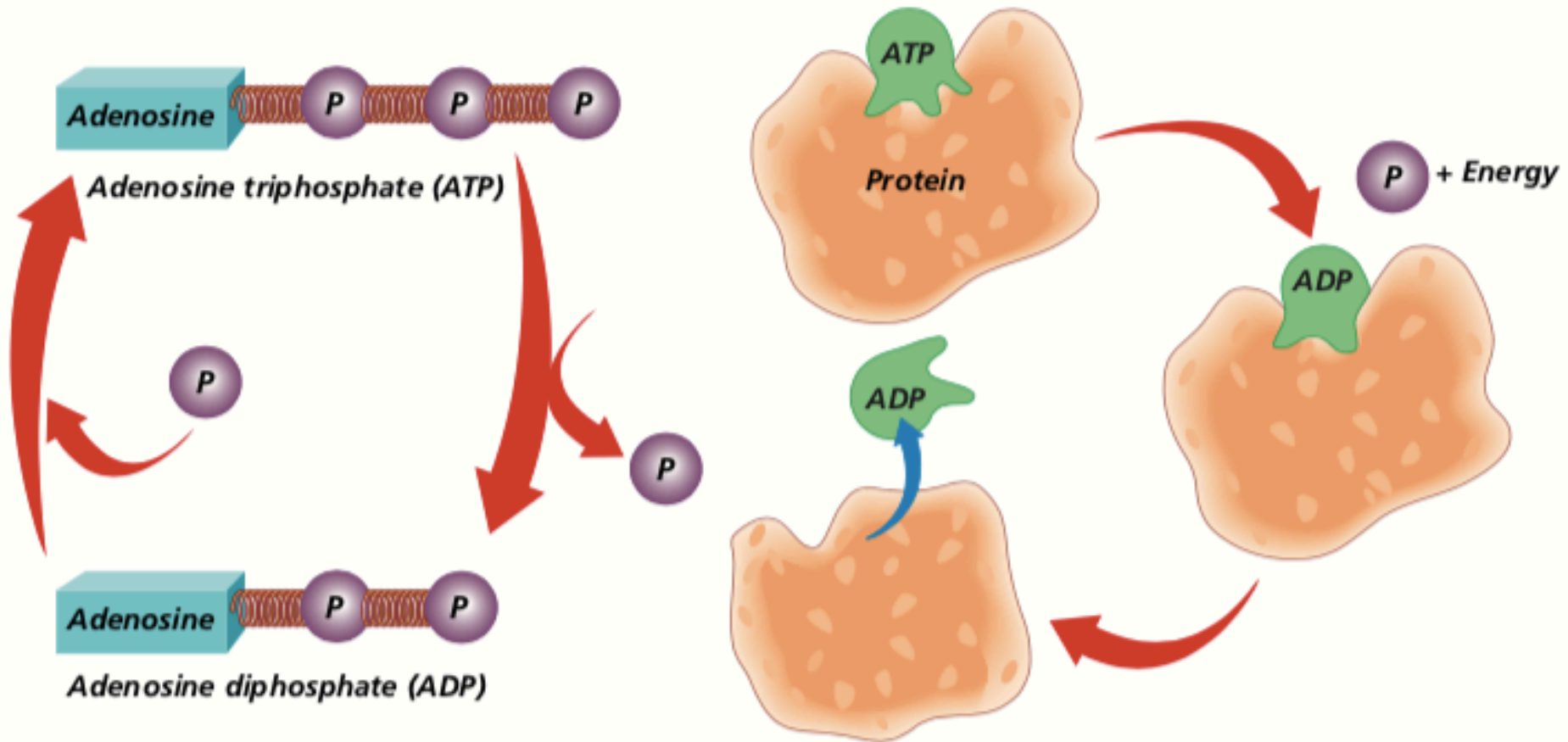
Sugar stores too much energy for a cell to use at once, just like \$1000 is too much to use to buy Doritos at a gas station

ATP



ATP acts like
a \$1 bill; it stores a
small, usable amount
of energy





How does ATP give cells energy?

ATP breaks apart and releases its energy.



<https://youtu.be/NN5Y57NbnrU>

9.2: PHOTOSYNTHESIS

Photo – light

Synthesis- to make

To make food using light

<https://youtu.be/eo5XndJaz-Y>

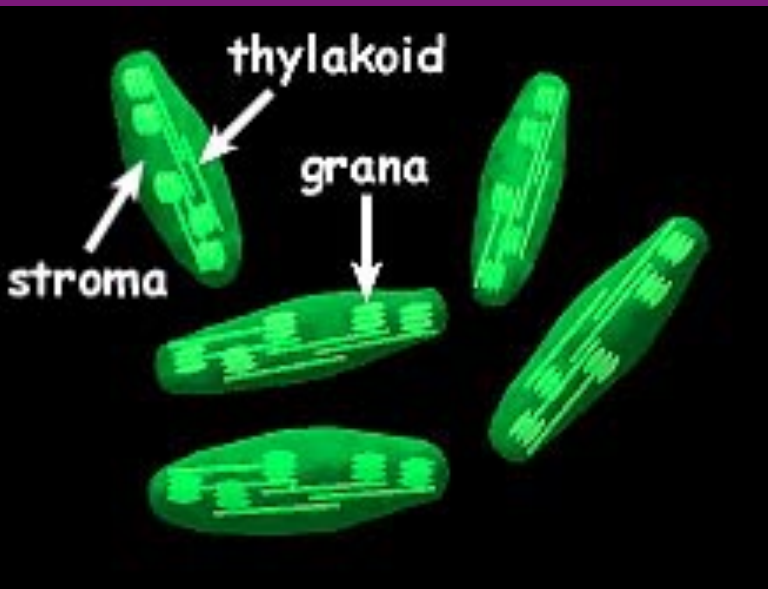
What is the main organelle of photosynthesis?

❖ Chloroplasts

Tiny sacs of chlorophyll (green pigment)

2 parts:

1. Stroma: liquid part
2. **Grana**: sacs containing **chlorophyll** (surrounded by thylakoid membranes)



Occurs in:

- Plant cells
- Bacteria (some Prokaryotes)

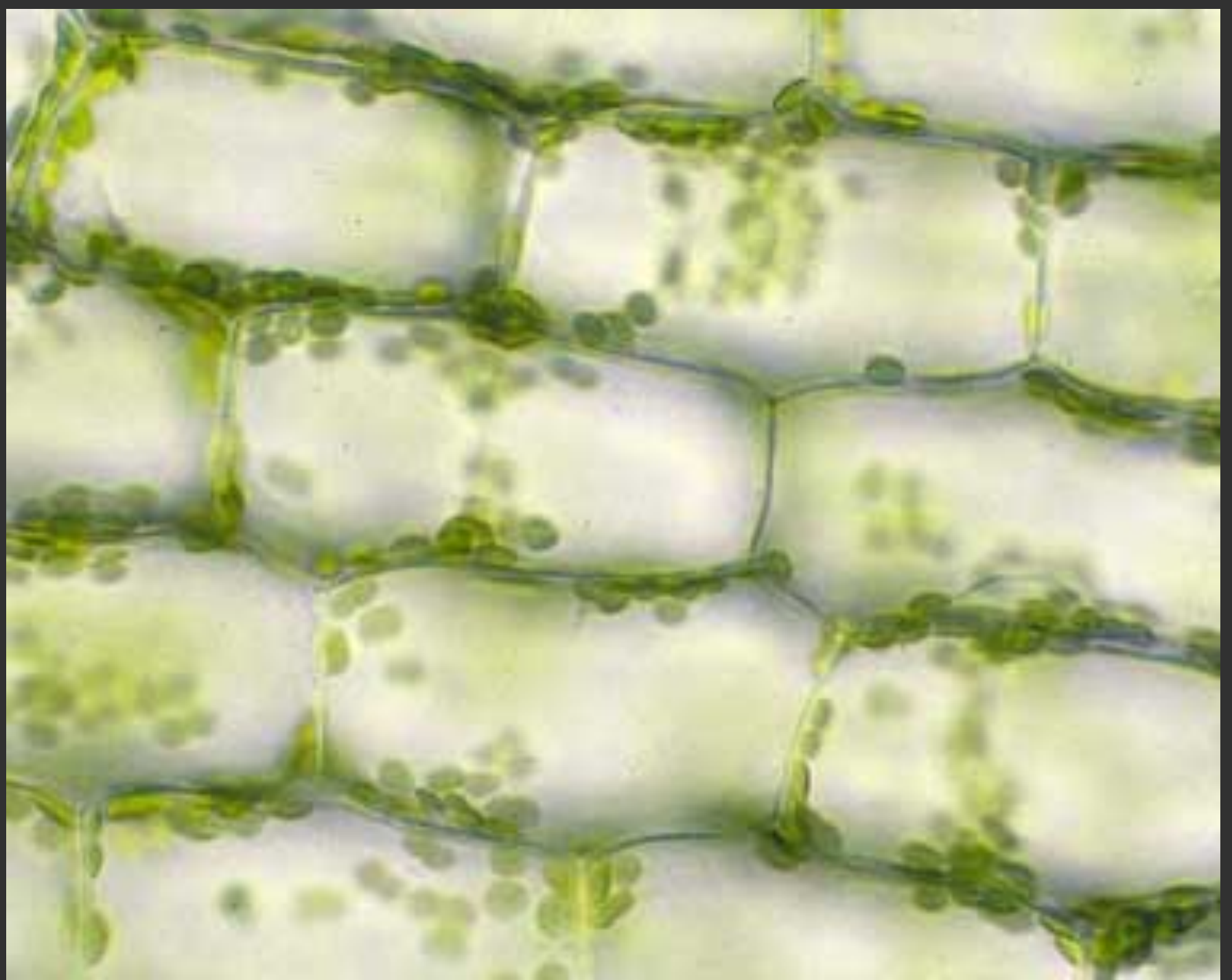
Chlorophyll's job



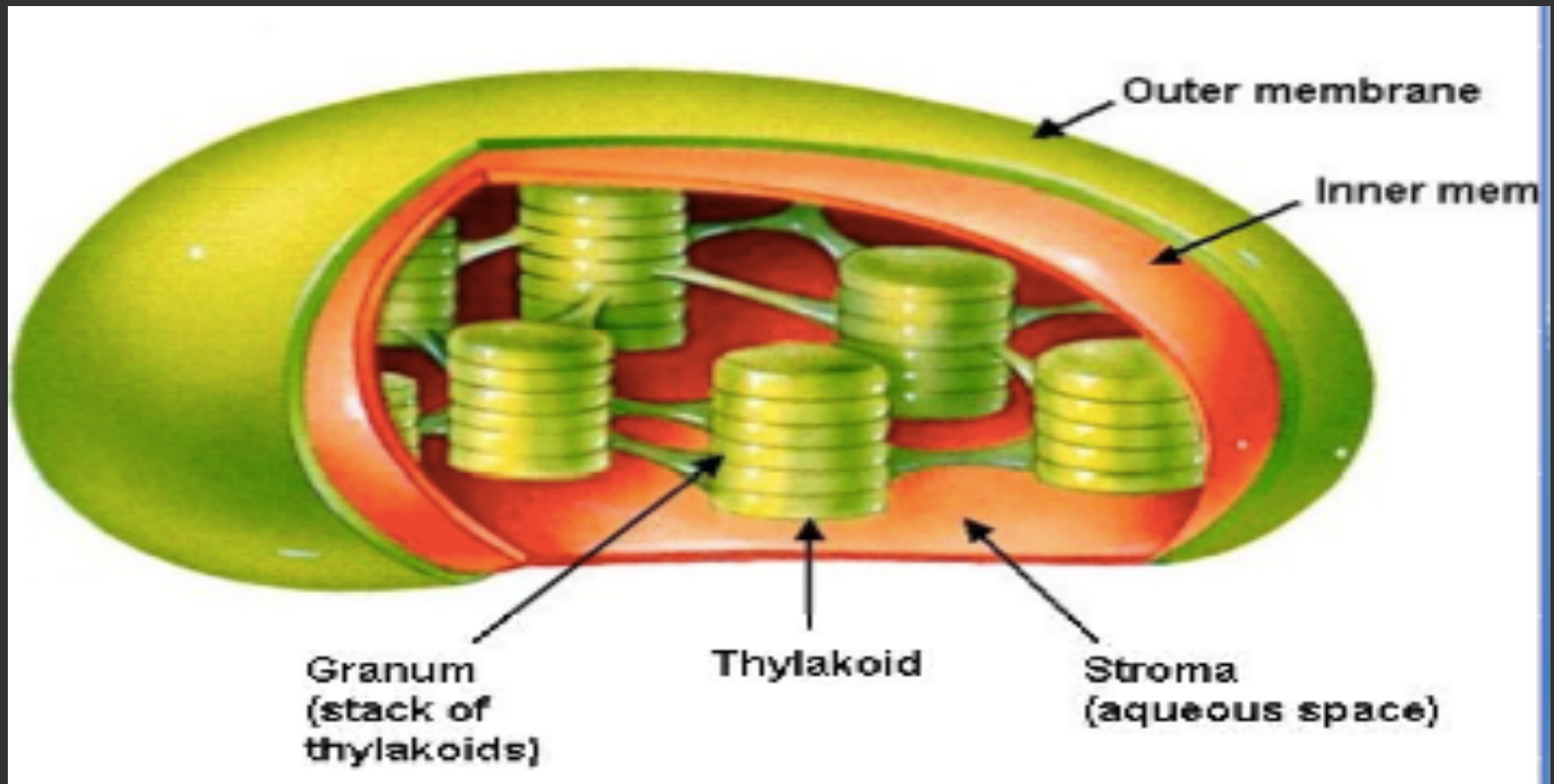
- Collects energy from the sun
- Plants use this energy to change carbon dioxide and water into carbohydrates

Roots do not have chlorophyll:

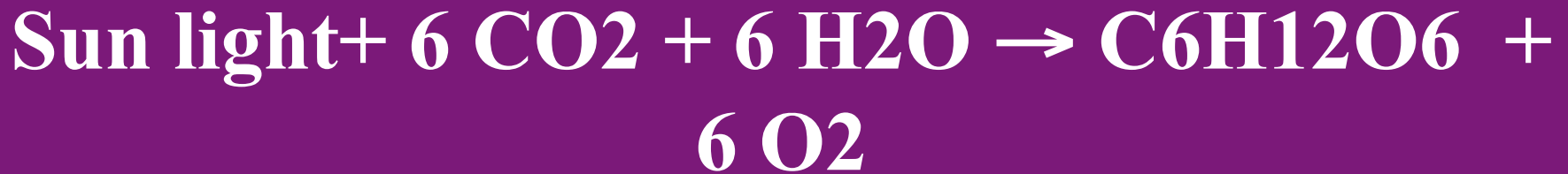
Roots do not make food,
their job is to take in water!



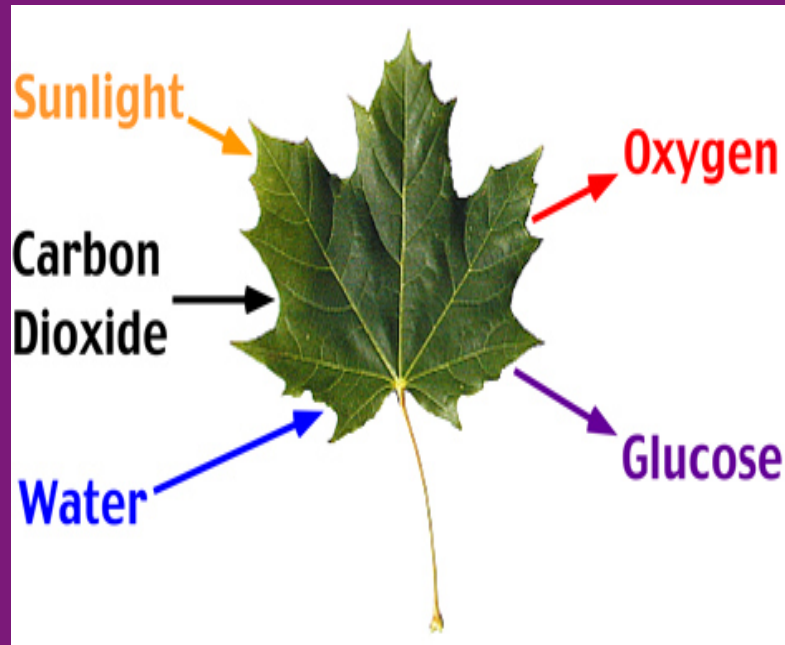
Sketch the following:



Photosynthesis



Carbon Dioxide + Water makes Glucose (Sugar) & Oxygen.



First Step of Photosynthesis

1. “Light Dependent Reactions”
(happens in thylakoids/grana)
 - Chlorophyll is excited by light
 - Oxygen is released as a waste product

The Purpose of the Light Reaction is to charge the battery (ADP-->ATP)

It will produce ATP and NADPH (energy molecules)

Second Step of Photosynthesis

- Dark Reaction, or the “Calvin Cycle”
 - Takes place in the Stroma
- **Energy produced** from light dependent reaction is **used** to **make sugars** for the plant to use.

Why is it called the dark reaction?

Because it happens without light!

<https://youtu.be/0UzMaoaXKaM>