

# Photosynthesis

\*The process by which plants take in  $CO_2$  &  $H_2O$  and use the energy from the sun to make carbohydrates and release  $O_2$

# Respiration

\*The process by which animals take in  $O_2$  and use carbohydrates to get ENERGY and release  $CO_2$  as waste

## BIOCHEMICAL PATHWAY:

A series of chemical reactions in which the **product** of one rxn is consumed in the next reaction (used as the **reactant** of the next rxn).

# VISIBLE SPECTRUM!

\*the array of colors that make up light

Wavelength: distance from peak to peak

Absorb = to take in (you can't see it)

Reflect = to bounce back (you can see it)

PIGMENT: a compound that absorbs light  
( Chlorophyll A )

Accessory pigment - helper (chlorophyll B)

carotenoids - (yellow/orange/brown) AP's

Chloroplast- double membrane structure in a plant wherein light reactions take place

Grana - stacks of discs which make up thylakoids

Stroma - the liquid surrounding thylakoids

LIGHT REACTIONS: (inside thylakoid)

The initial rxns of photosystems

- 1) absorption of light (P1,P2)
- 2) electron transport
- 3) produce NADPH & O<sub>2</sub> (oxidation)
- 4) synthesis of ATP (chemiosmosis)

Photosystem - a cluster of pigments

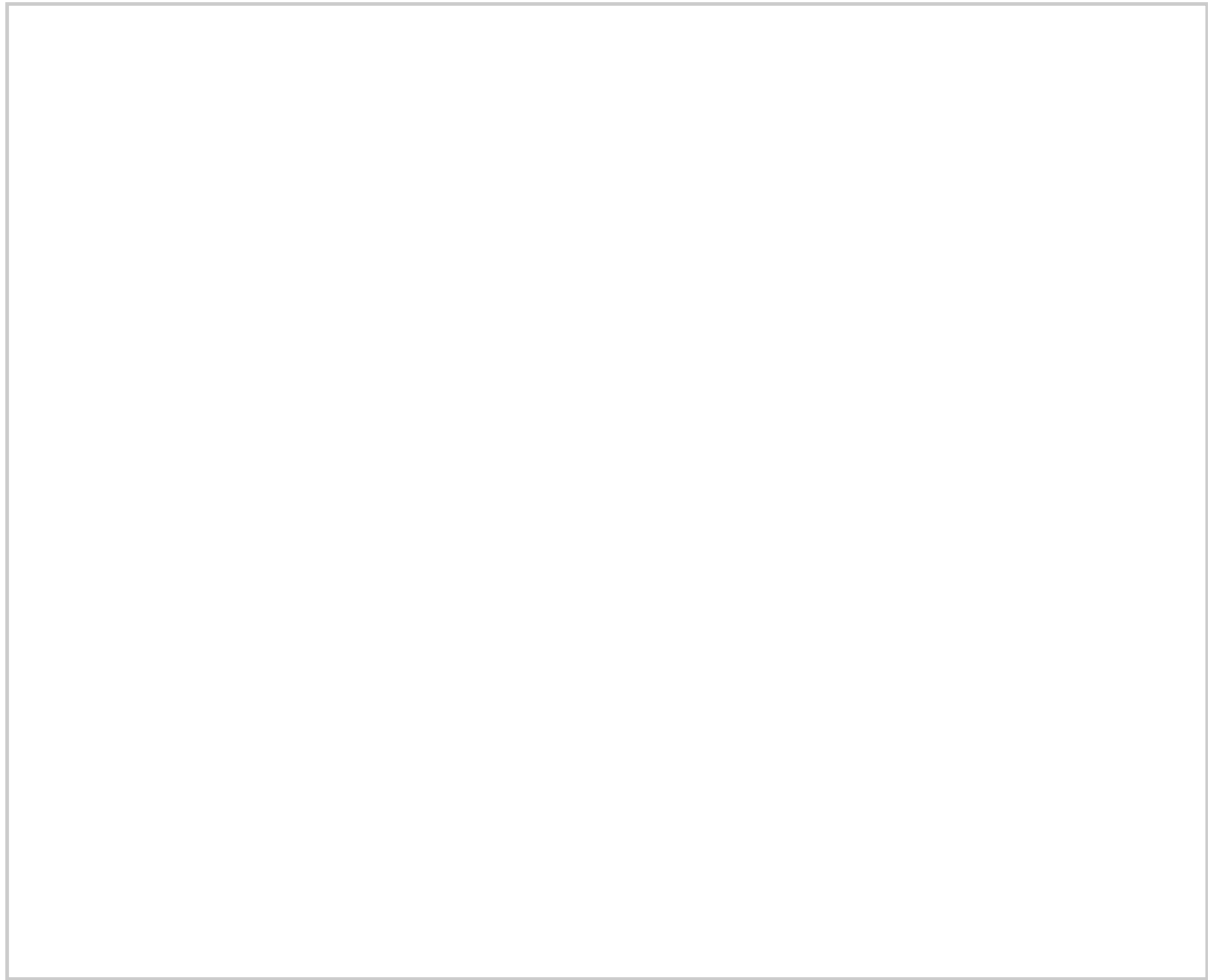
Primary electron acceptor - a substance that accepts electrons (reduction)

Chemiosmosis -

- movement of protons (hi to lo conc)
- into the stroma
- releases energy
- used to manufacture ATP

ATP synthase (enzyme)

puts ADP & P back together again



# CALVIN CYCLE

A pathway that fixes carbon from  $CO_2$  to organic compounds

\*occurs in the stroma

\*NOT light dependent

RUBP (rubisco) - a 5-carbon carbohydrate that provides the pathway for carbon fixation

PGA - a 3-carbon compound  
that receives a "P" from ATP  
and a Proton from NADPH  
to produce

PGAL - resultant from PGA rxn  
produces NADP<sup>+</sup>, ADP, and P

## C3 plants:

Plants that fix carbon from PGA(3 C's)

Stomata - pores on the undersurface of plants that open to allow passage of water, CO<sub>2</sub> in, and O<sub>2</sub> out

( Lo Co<sub>2</sub>/Hi O<sub>2</sub> inhibit Calvin cycle)

C4 plants - alternative pathway (fix CO<sub>2</sub> into 4 carbon compounds.

-partially close stomata during day

- corn, sugar, crabgrass

## CAM plants -

alternative pathway - open stomata at  
night

- very hot, dry climates
- grow slowly
- cactus & pineapple

