# Review 14

**Photosynthesis:**
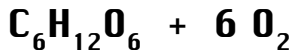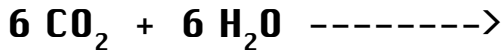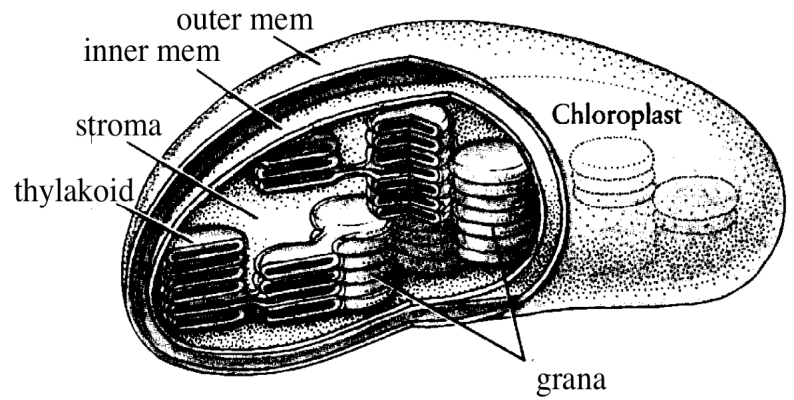
$$6\ CO_2\ +\ 6\ H_2O\ \text{-------}\!\!>$$
$$C_6H_{12}O_6\ +\ 6\ O_2$$

## ENERGY GATHERING REACTIONS
### (on thylakoids of chloroplasts)

1) absorbed light raises energy levels of electrons in photosystem I; [now] high energy electrons transferred from chlorophyll p700 to NADPH (provides source of high energy electrons for carbon fixing)

2) electrons from photosystem II raised in energy by light absorption; travel through cytochromes (making some ATP— provides source of energy for carbon fixing); finally replace electrons lost from photosystem I

3) low energy electrons from water fed into photosystem II to replace electrons lost to photosystem I; free oxygen gas made as by-product of energy gathering reactions

✓<u>Result of light reactions is</u> supply
   ☞ATP        ☞high energy electrons (carried in NADPH)

## CARBON FIXING, REACTIONS (in stroma of chloroplasts)

✓ Carbon dioxide converted into glucose via Calvin Cycle
   1 carbon dioxide fixed/cycle of the Calvin Cycle
   6 cycles of Calvin Cycle produces 1 glucose molecule
✓ 18 ATP and 12 pair of high energy electrons from (12) NADPH required in order to make one glucose

## Interrelationship between respiration and photosynthesis

CELLULAR RESPIRATION

⬆          ⬆

carbon dioxide + water          glucose + oxygen

⬇          ⬆

PHOTOSYNTHESIS
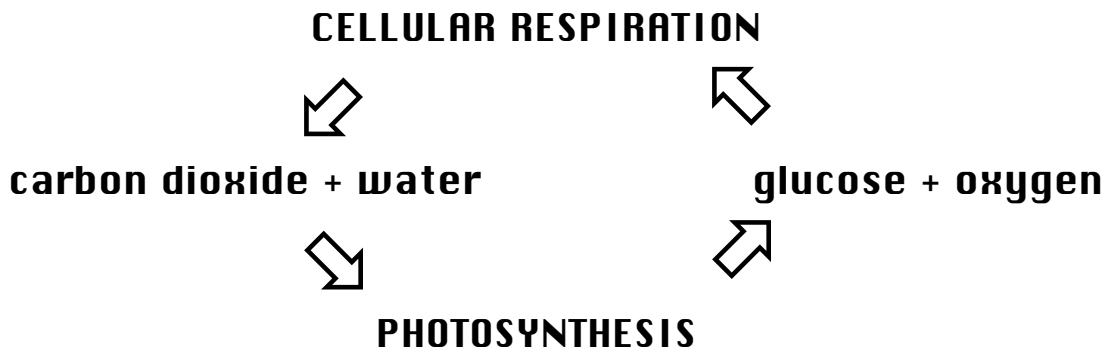
✓Carbon dioxide as a greenhouse gas and global warming

## CELLULAR INFORMATION

**Hereditary Factors:** those materials in a cell which cause the offspring to look and behave so much like the parents
  ☹Blending Theory of Inheritance
  ☹Theory of Acquired Inheritance

**Hereditary Factors:** Where are they?
                                      What are they?
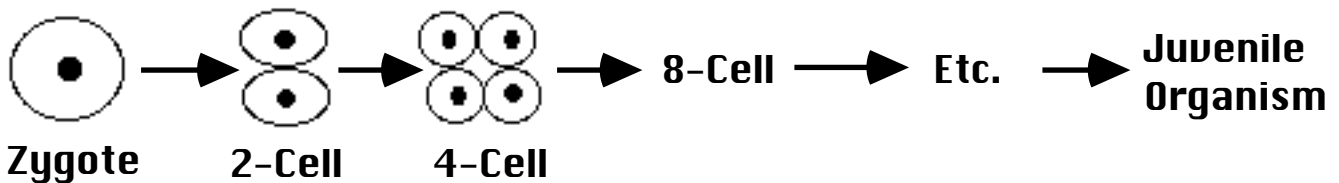                                      How do they work?
                                      How do they get passed on?

## WHERE ARE THEY?

Early experiments performed with developing embryos
  Unfertilized eggs -- metabolically inactive
  Fertilized eggs (zygotes) - metabolically very active



Zygote      2-Cell      4-Cell

Experiments of Driesch (sea urchin) and Spemann (salamander)
  1) localized hereditary factors to nucleus of cell and
  2) demonstrated that hereditary information wasn't diminished by repeated cell divisions
  these experiments solved the "where" question