Light: from the sun or an artificial light source- plants adapt to have as much light hitting the leaf surfaces as possible… How? Spread of branches and leaves, and positive phototactic response which makes plants grow towards the light and orient leaves to light

3 factors that affect light received:
1) Angle of sun's rays
2) Length of growing season
3) Length of day

Chlorophyll: pigment that makes plants look green- 2 kinds in plants-:**chl a** and **chl b**
- found in the thylakoid membranes of the chloroplast
- absorbs light most strongly in the blue and red portions of the spectrum
- other chlorophylls (c1, c2, d, f) exist in algae and cyanobacteria
- other pigments (carotenoids and xanthophylls) assist in light capture
-in fall, cold temperatures (plant senescence) cause breakdown of chlorophyll to colorless molecules, thus unmasking the other pigments and showing fall leaf colors

Minerals: needed for formation of enzymes to catalyze the reactions as well as the formation of carbs, proteins, nucleid acids and lipids
-Nitrogen: need reactive nitrate ions from the soil to form proteins and chlorophyll
-Magnesium: obtained from the soil to form chlorophyll

Glucose ($C_6H_{12}O_6$): end product of photosynthesis used by the plant for metabolism and growth
- may be used as an energy source for respiration
- may be converted to starch and stored in the leaf. Why?
1) Soluble glucose might dissolve in water around the cell and be lost from the plant
2) Solubility increases concentration of sugar in the cell and can damage the cell

Starch is insoluble, so it can be stored as starch grains in chloroplast or in tubers…

Oxygen (O_2): 'waste' product of photosynthesis that diffuses out of the leaf via stomata

Factors that affect the Rate of Photosynthesis

1) **Light Intensity**- as light intensity increases, the rate of photosynthesis increases until the plant is photosynthesizing at its maximal rate.

2) **Temperature**- as temperature increases, the rate of photosynthesis increases. So a plant will photosynthesize faster on a warm day than a cold day.

3) **Concentration of reactants**- if the reactants (CO_2 and H_2O) are limited in concentration, the reaction itself will be limited by what's available.

4) **Weather**- On hot days, stomata close to prevent water loss. If the stomata are closed no CO_2 is available and photosynthesis cannot take place.