Photosynthesis

ALL living things need energy!

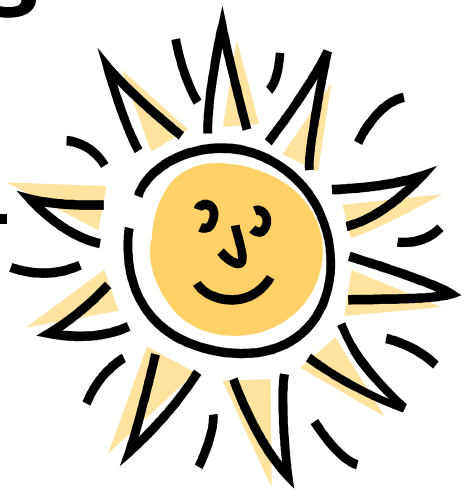
- Energy comes in different forms…
  - Light
  - Heat
  - Electricity…

- Where do we (heterotrophs) get our energy?

- Where do plants (autotrophs) get their energy?

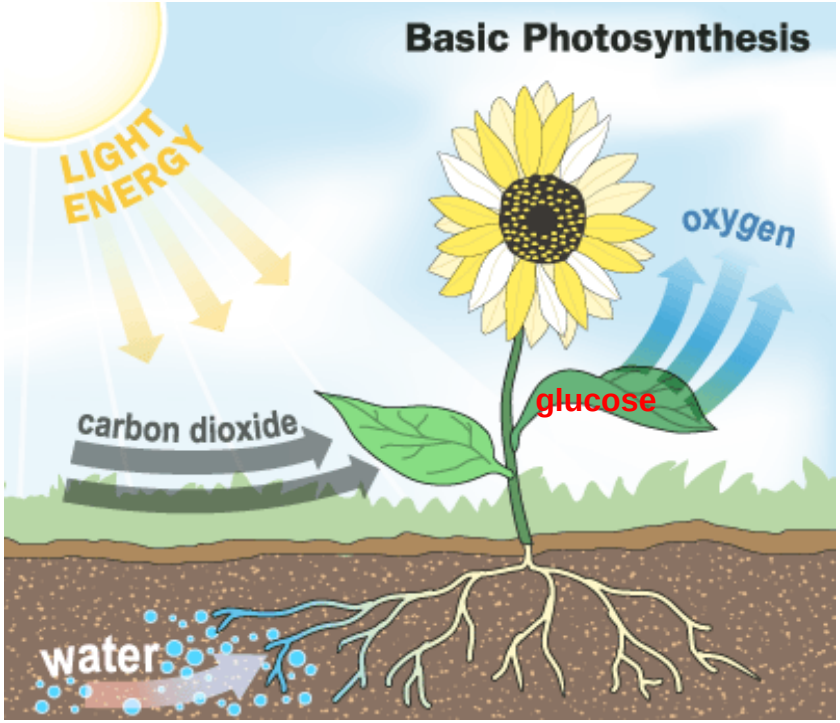
Photosynthesis

- Plants get energy from the sun.



- **Purpose of photosynthesis**
  - Converts light energy into chemical energy in the form of glucose
  - Energy is stored in glucose

What does photosynthesis require?



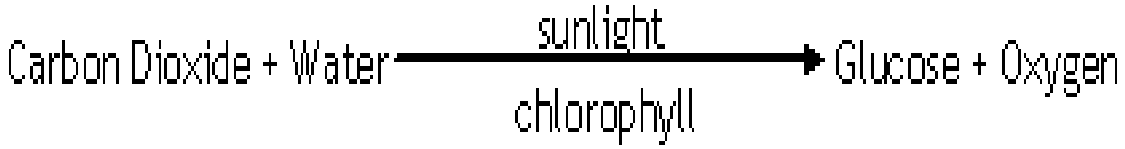
What does photosynthesis produce?

Photosynthesis Equation

$$6\ CO_2 + 6\ H_2O \xrightarrow[\text{chlorophyll}]{\text{sunlight}} C_6H_{12}O_6 + 6\ O_2$$

Remember the reactants are at the beginning of the chemical reaction and undergo a change and the products are created at the end of a chemical reaction.

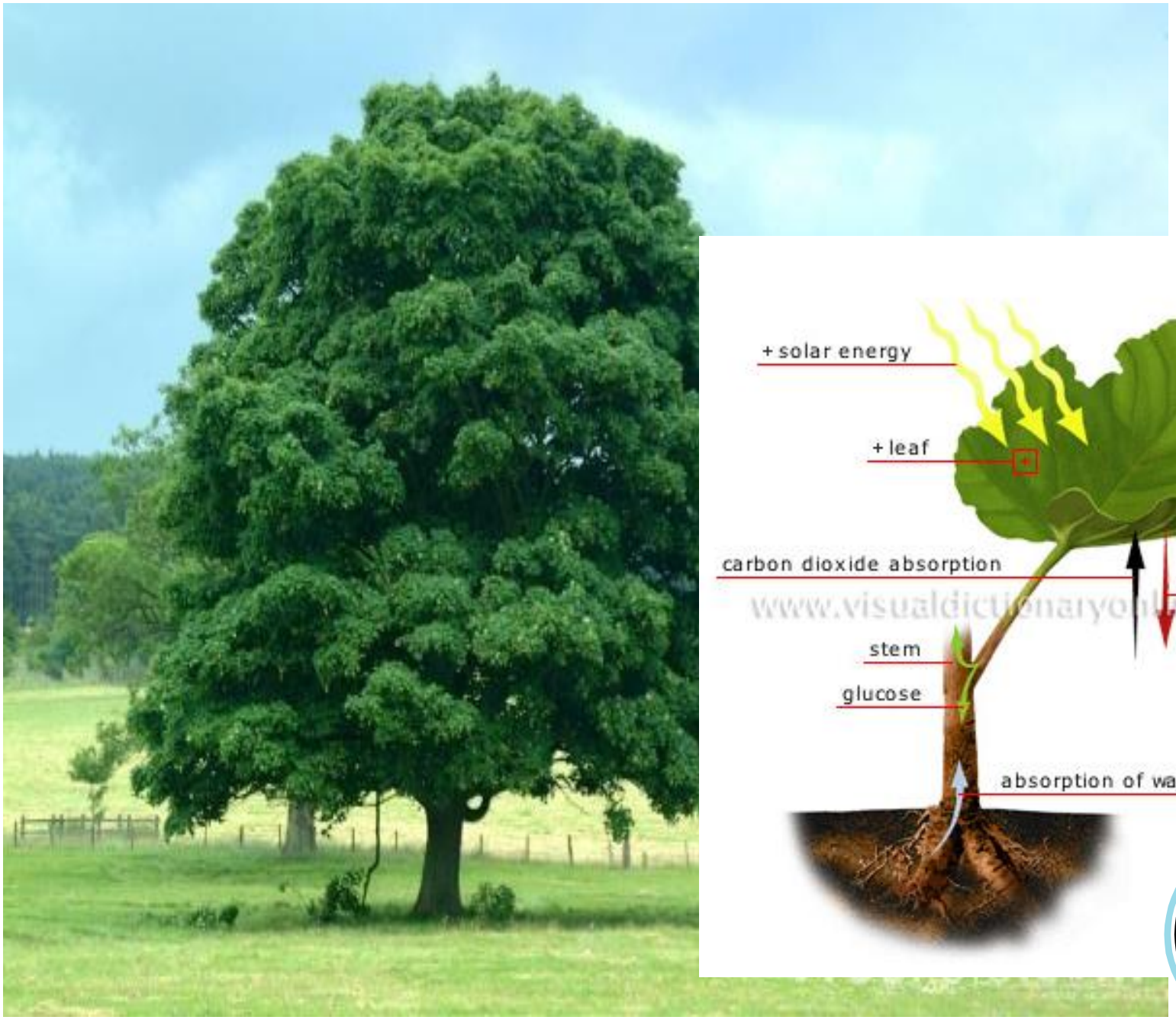
Photosynthesis Equation

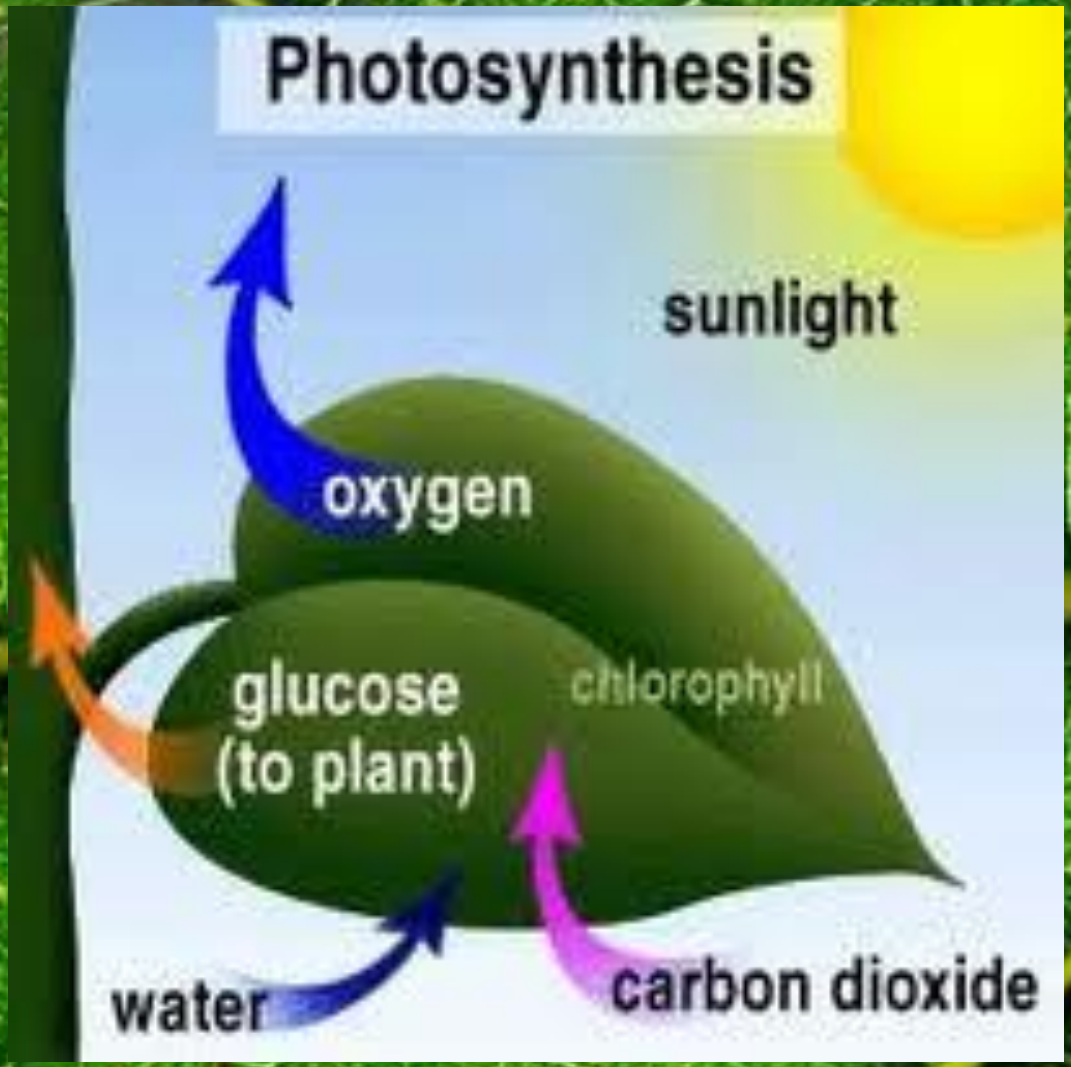


Reactants	Products

Photosynthesis

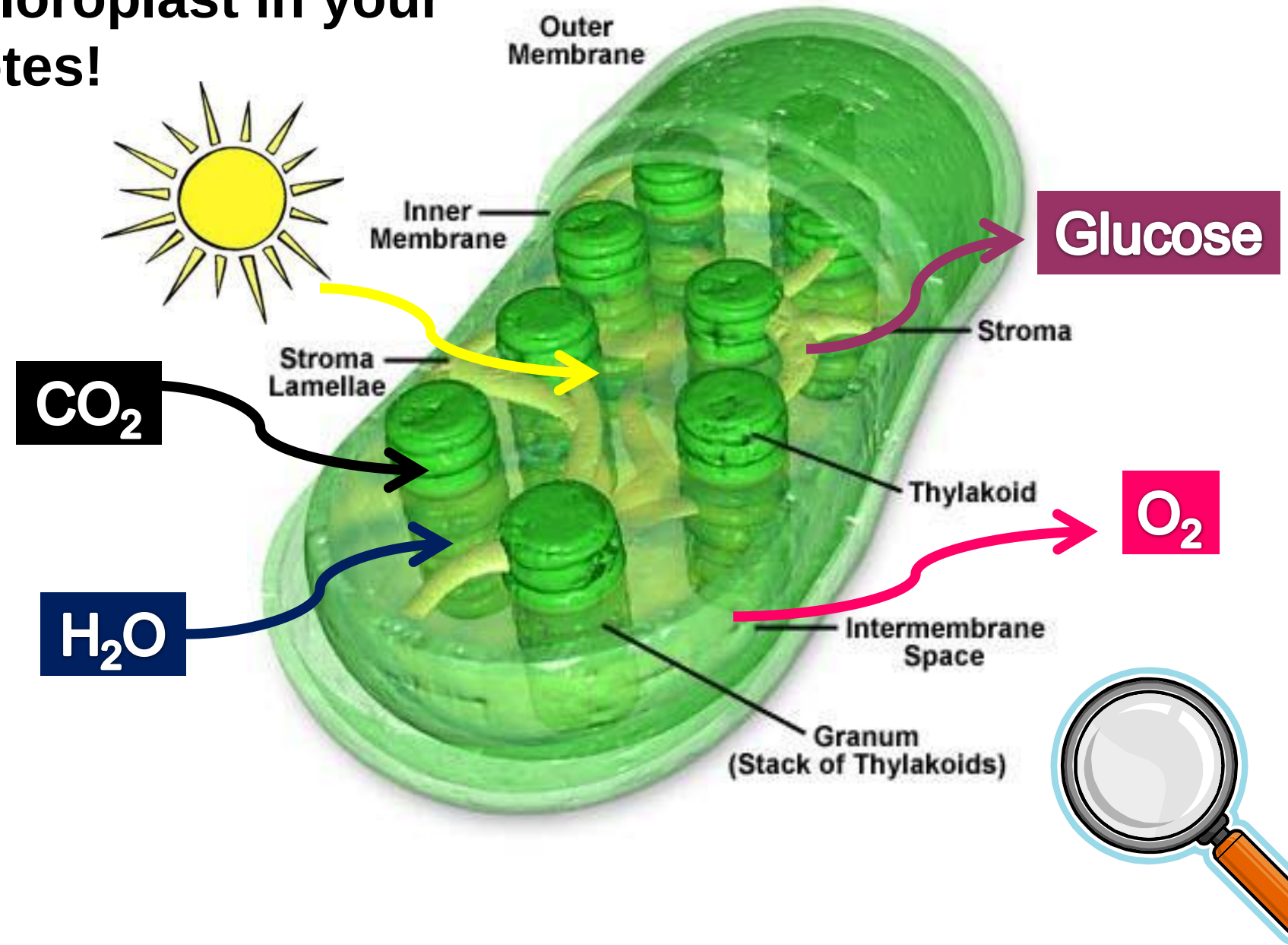
- Photosynthesis takes place in…
  - ➔Autotrophs (like plants)
    - ➔Leaves
      - ➔Cells
        - ➔Chloroplasts


+ solar energy
+ leaf
carbon dioxide absorption
release of oxygen
www.visualdictionaryonline.com
stem
glucose
absorption of water and mineral salts


Photosynthesis
sunlight
oxygen
glucose
(to plant)
chlorophyll
water
carbon dioxide


Hope & Paige
400x

Draw a picture of the chloroplast in your notes!

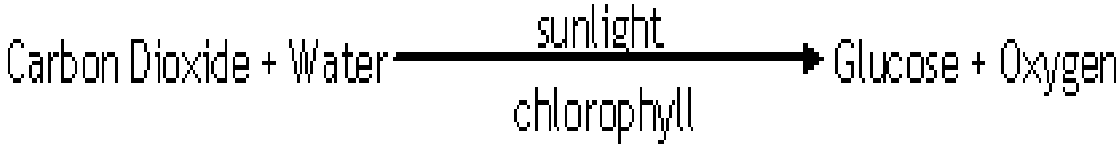


Chloroplasts = site of photosynthesis

- Chloroplast contain chlorophyll
  - **<u>Chlorophyll</u>: green pigment that absorbs most light but reflects green light**

Factors affecting Photosynthesis

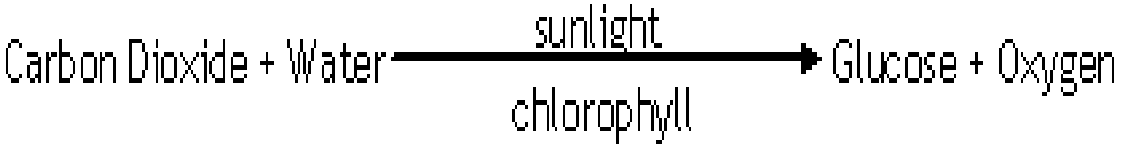
- **What are some things that could affect the rate of photosynthesis?**



- **How can we measure the rate of photosynthesis?**

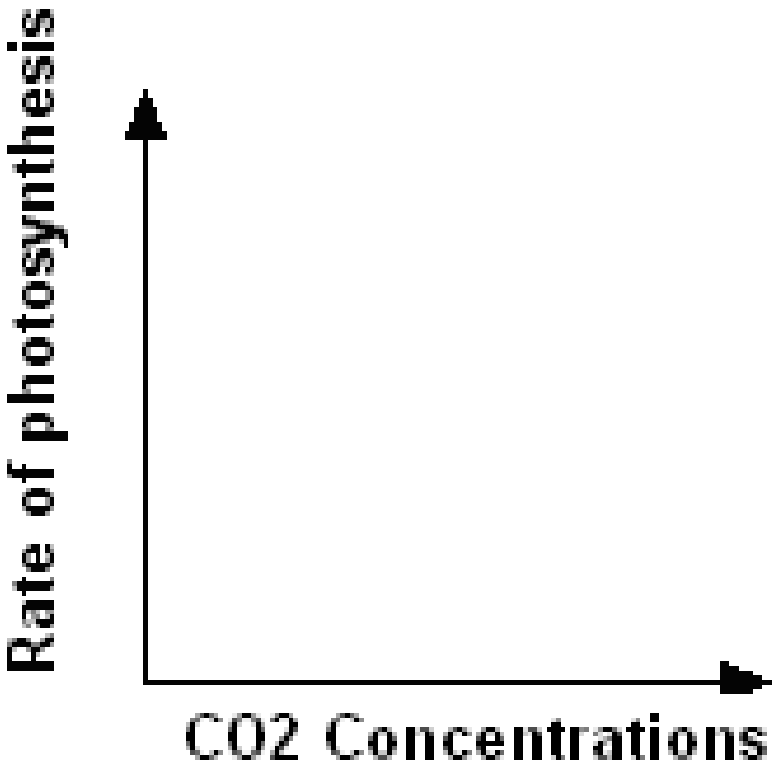
Factors affecting Photosynthesis

- **Availability of Reactants**
  - Dehydration causes photosynthesis to stop.
  - If light and CO_2 are not available, photosynthesis will stop.



Factors affecting Photosynthesis

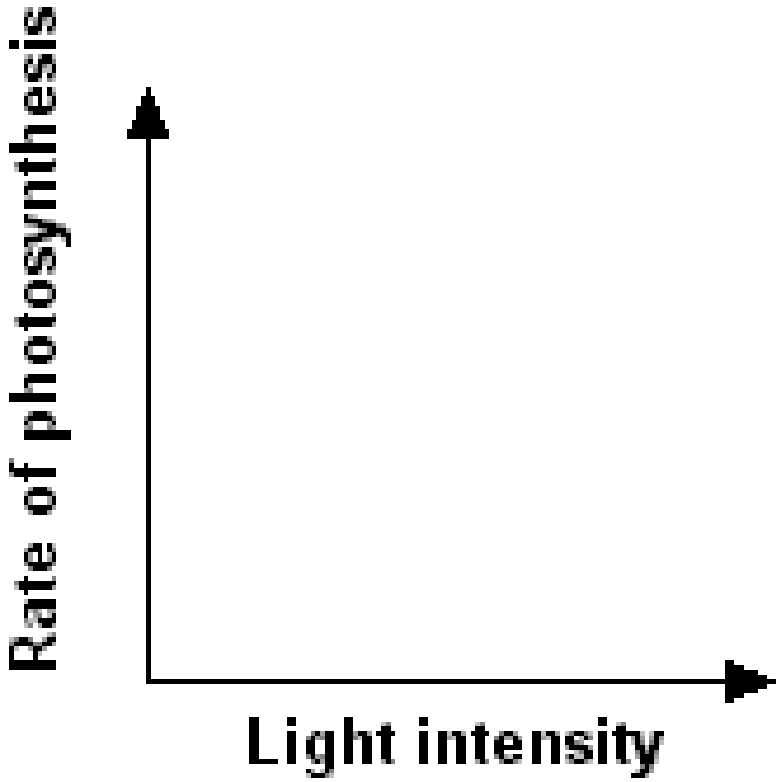
- **Amount of CO_2**
  - As CO_2 concentration increases, the rate of photosynthesis _____.



Virtual Lab

Factors affecting Photosynthesis

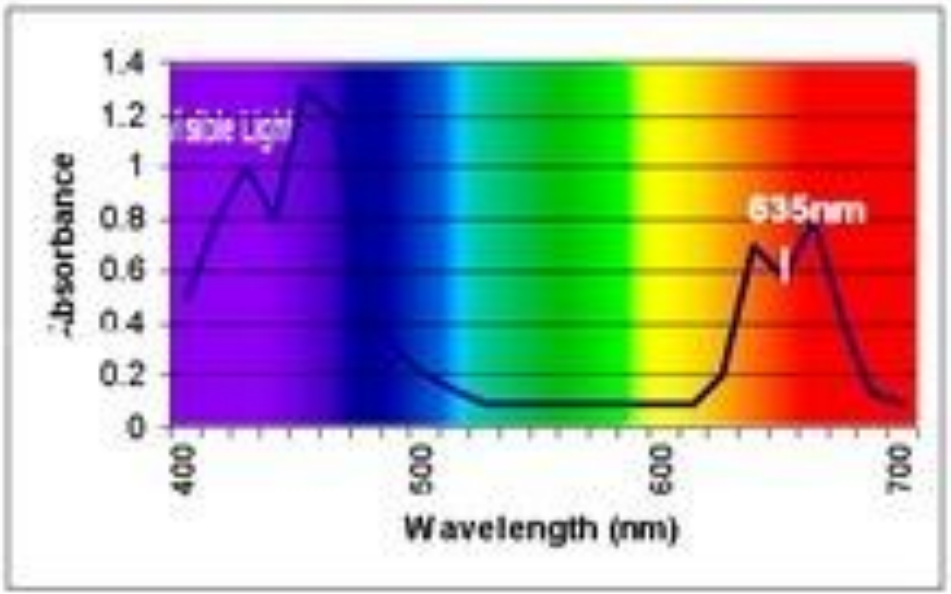
- **Intensity of light**
  - As the intensity of light increases, the rate of photosynthesis _____.



Virtual Lab

Factors affecting Photosynthesis

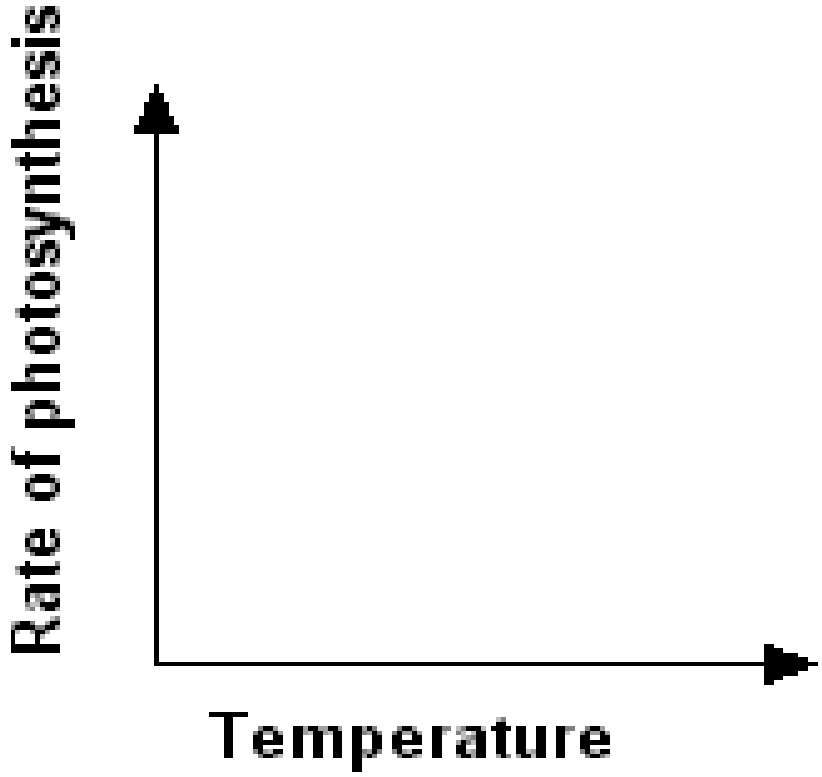
- **Color of Light**
  - White light contains ALL colors of the visible spectrum.
  - Chlorophyll absorbs most light but reflects green light



Virtual Lab

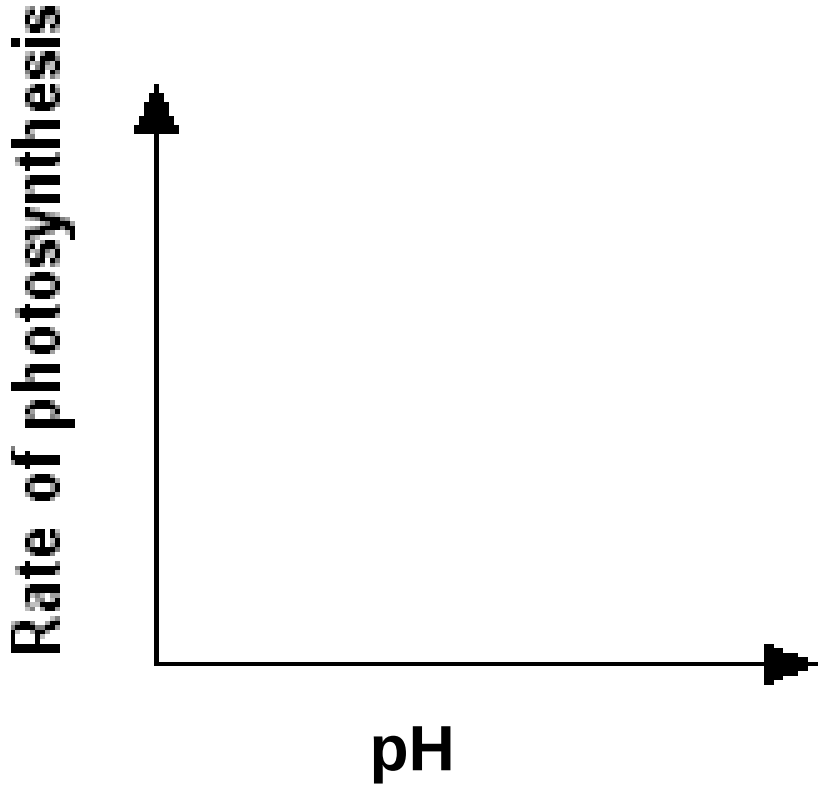
Factors affecting Photosynthesis

- **Temperature**
  - As temperature increases, rate of photosynthesis _____, but _____ at higher temperatures
    - due to enzymes being denatured



Factors affecting Photosynthesis

- **pH**
  - As pH increases, rate of photosynthesis _____, but _____ at higher pH
    - due to enzymes being denatured



Cellular Respiration

How do heterotrophs get energy?

Cellular Respiration

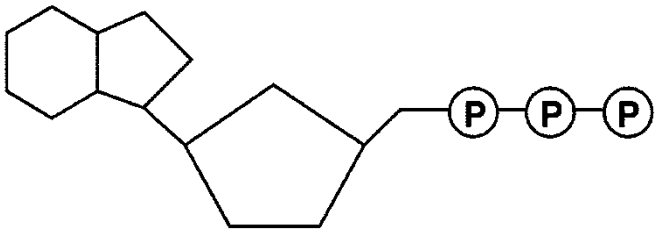
- Heterotrophs get energy from glucose stored in food.

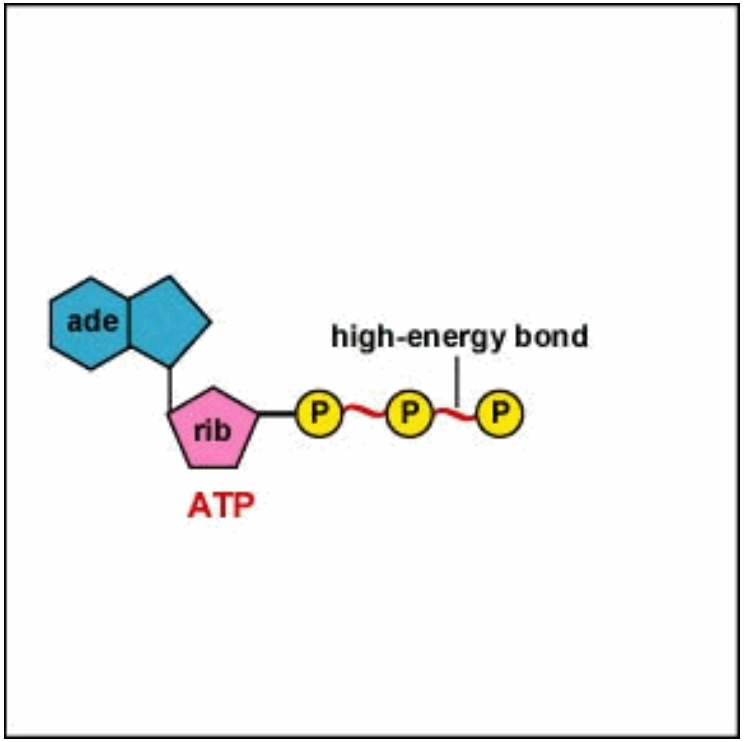
- **Purpose of cellular respiration**
  - Makes ATP = 

  - Releases chemical energy from glucose and converts it into ATP

ATP = Usable Energy

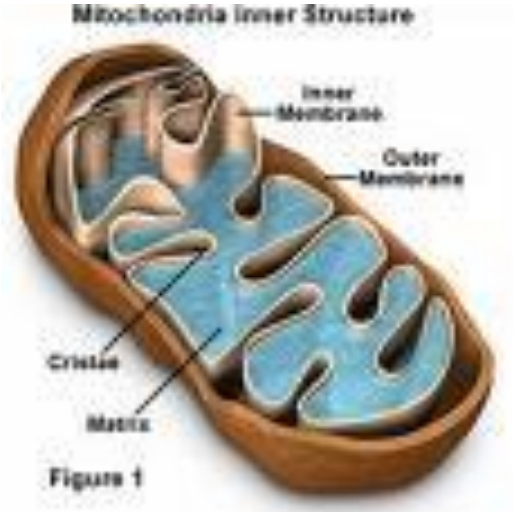
- **ATP = adenosine triphosphate**
  - **Energy is released when bonds are broken.**
  - **This energy can be used for cell processes.**





Cellular Respiration

- Cellular respiration takes place in…



MITOCHONDRIA of PLANT AND ANIMAL CELLS!

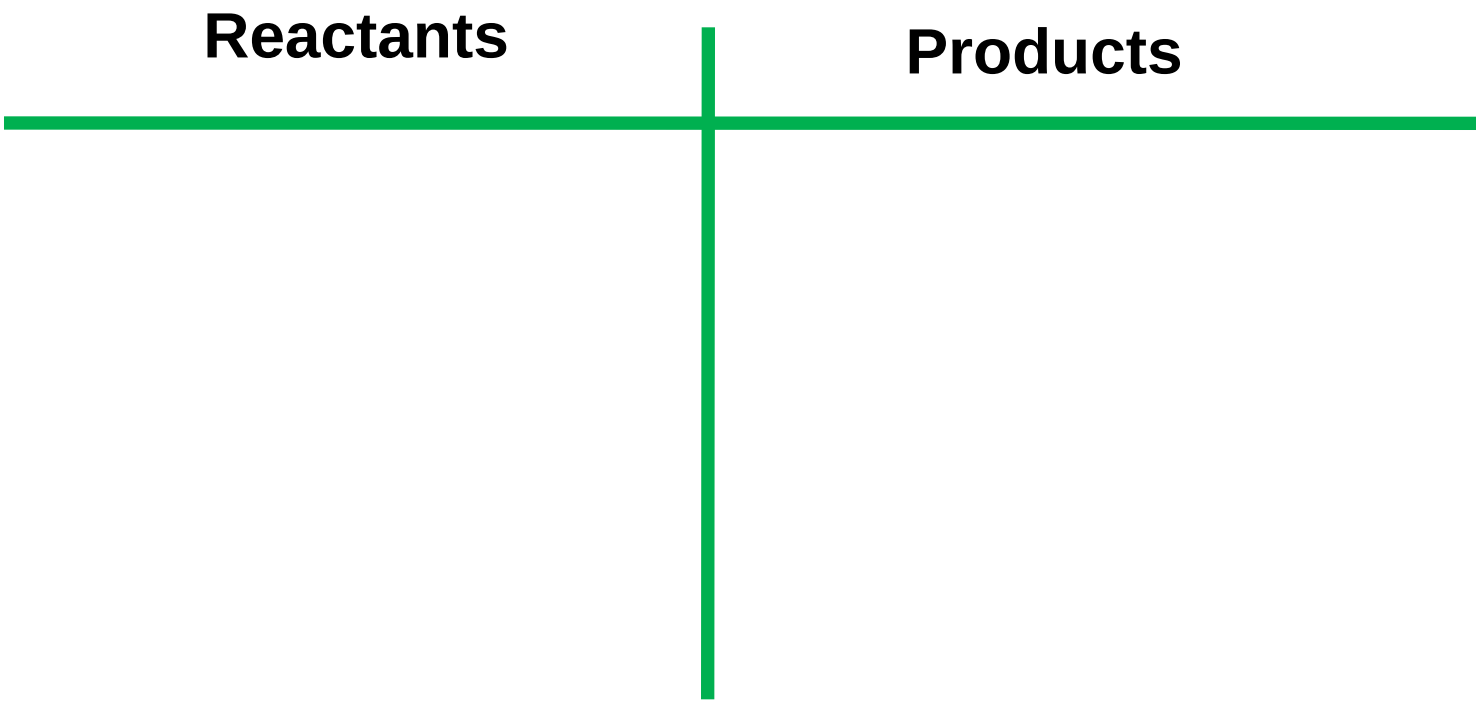
What does respiration require?

What does respiration produce?

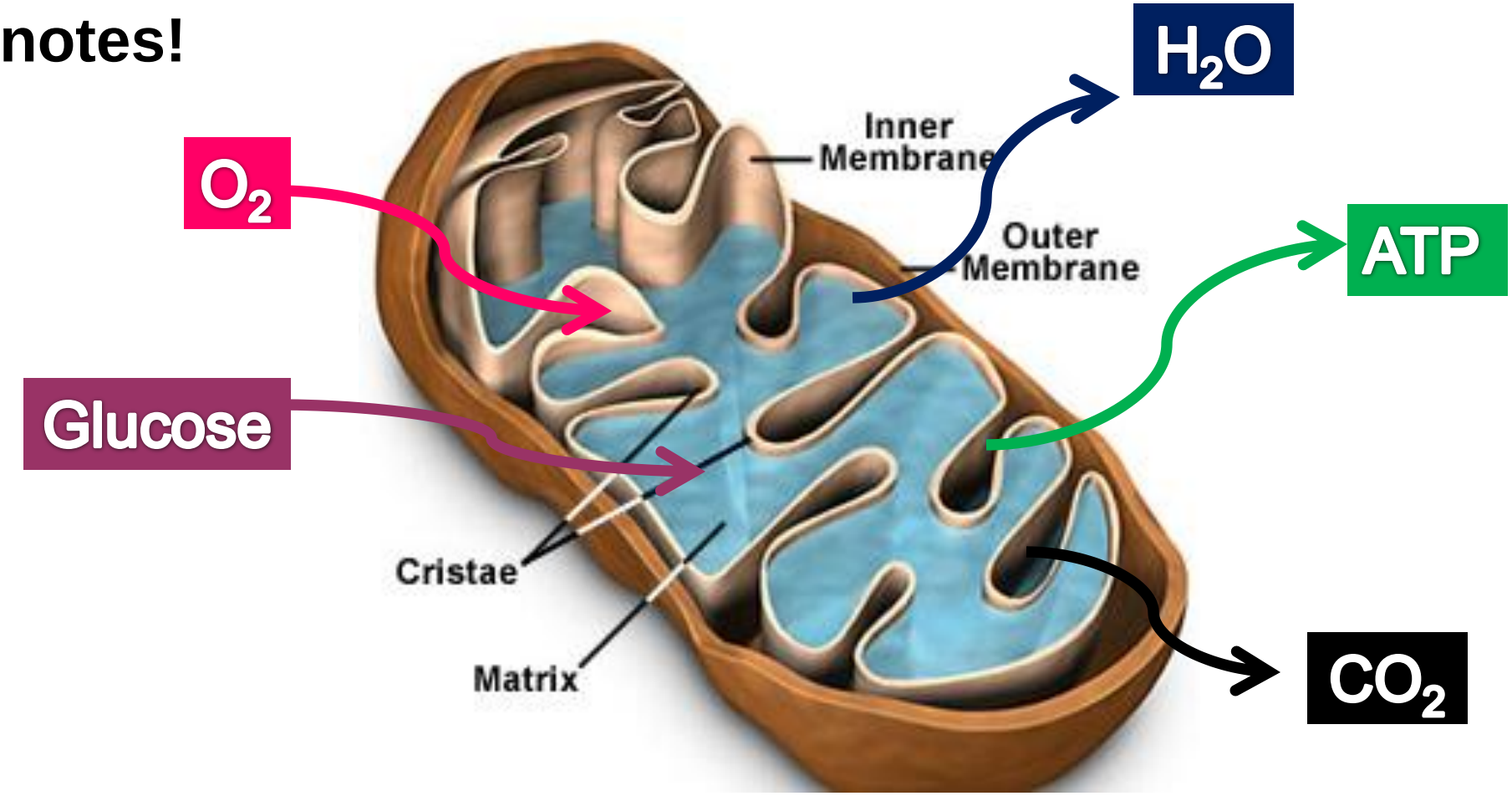
Cellular Respiration Equation

$C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O + ATP$

Glucose + Oxygen → Carbon Dioxide + Water + ATP



Draw a picture of the mitochondria in your notes!



2 Types of Respiration

$C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O + ATP$

Aerobic Respiration

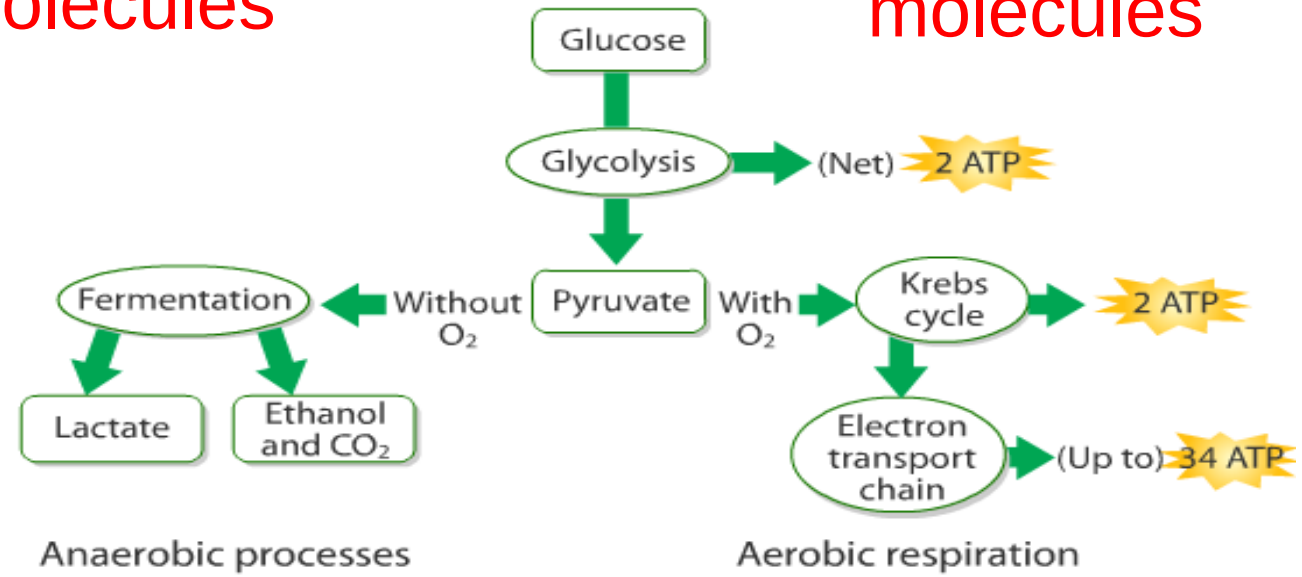
= with oxygen

- Produces 36 ATP molecules

Anaerobic Respiration

= without oxygen

- Produces 2 ATP molecules



What happens when there is no oxygen?

- **Anaerobic respiration is also called fermentation.**
  - Two types of fermentation
    - Lactic Acid fermentation
    - Alcoholic fermentation

Factors affecting Cellular Respiration

- **What are some things that could affect the rate of cellular respiration?**

$$C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O + ATP$$

- **How can we measure the rate of cellular respiration?**

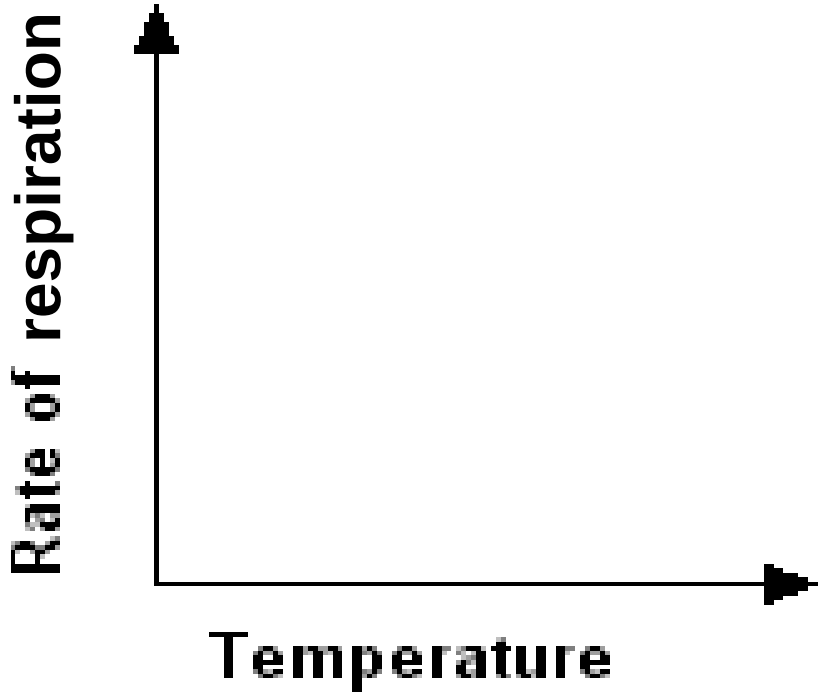
Factors affecting Cellular Respiration

- **ATP IS NECESSARY FOR LIFE so cells have a PLAN B.**
  - No glucose ➔ cell will break down fats and proteins
  - No oxygen ➔ cell goes through fermentation

$$C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O + ATP$$

Factors affecting Cellular Respiration

- **Temperature**
  - As temperature increases, rate of cellular respiration _____, but _____ at higher temperatures
    - due to enzymes being denatured



Factors affecting Cellular Respiration

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