

Lesson

Aerobic Cellular Respiration

What is your favorite Thanksgiving food?



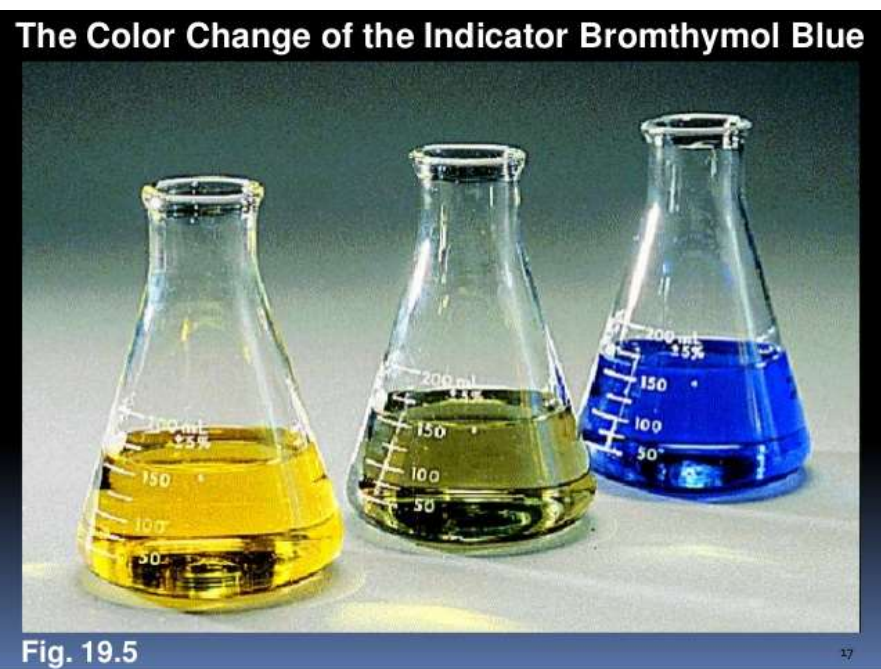
Bromothymol Blue Demo

Bromothymol blue is an indicator for.....

Carbon Dioxide (CO₂)

Color change blue → yellow

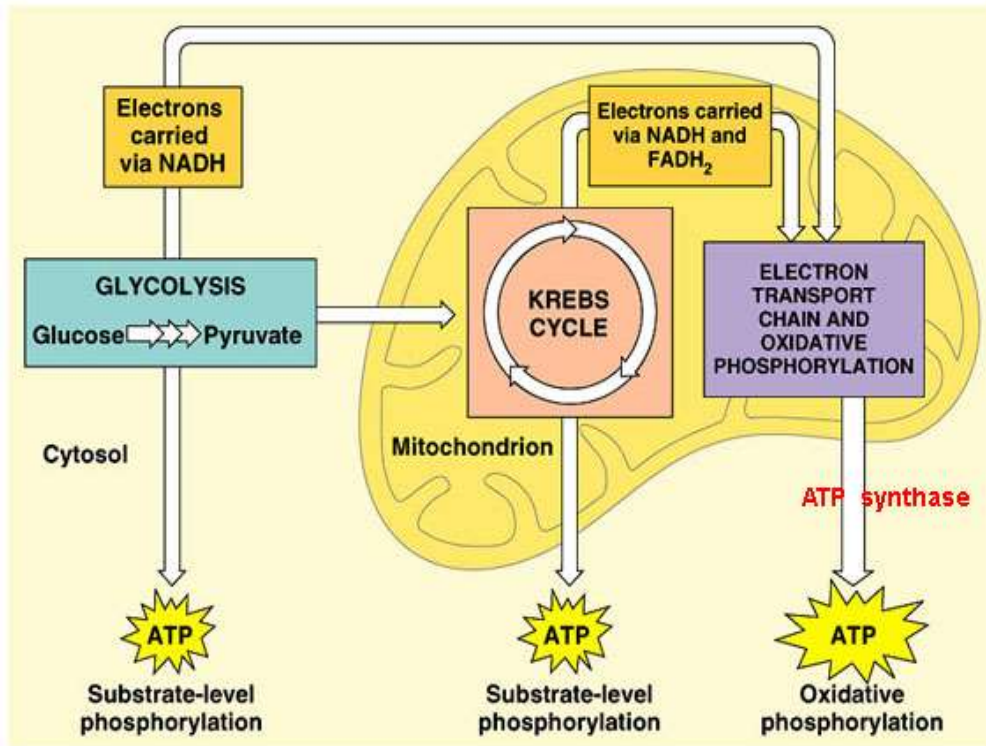
- We exhale this gas as a waste product of cellular respiration.



<https://www.youtube.com/watch?v=zBJCtbzrOr4>

Cellular Respiration

- Cellular process that releases energy to build ATP by breaking down food molecules



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Mitochondria Inner Structure

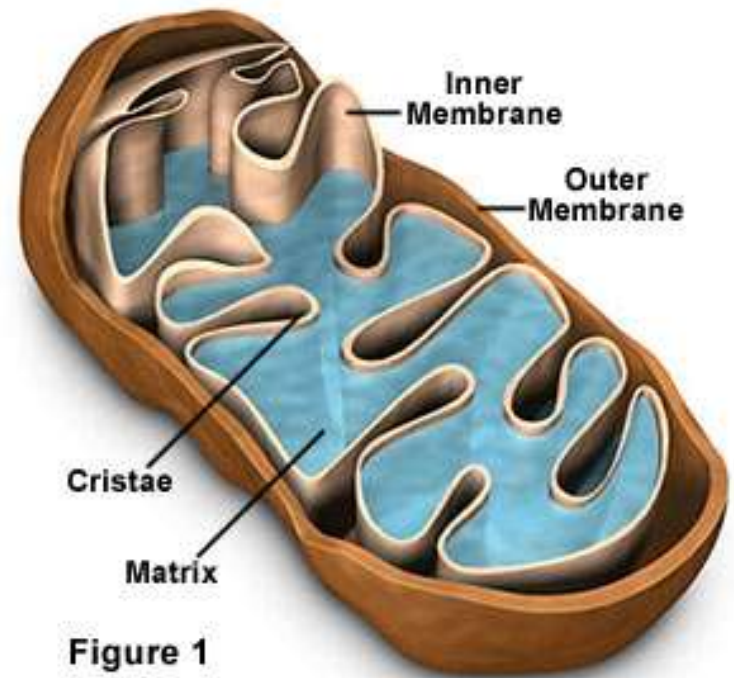
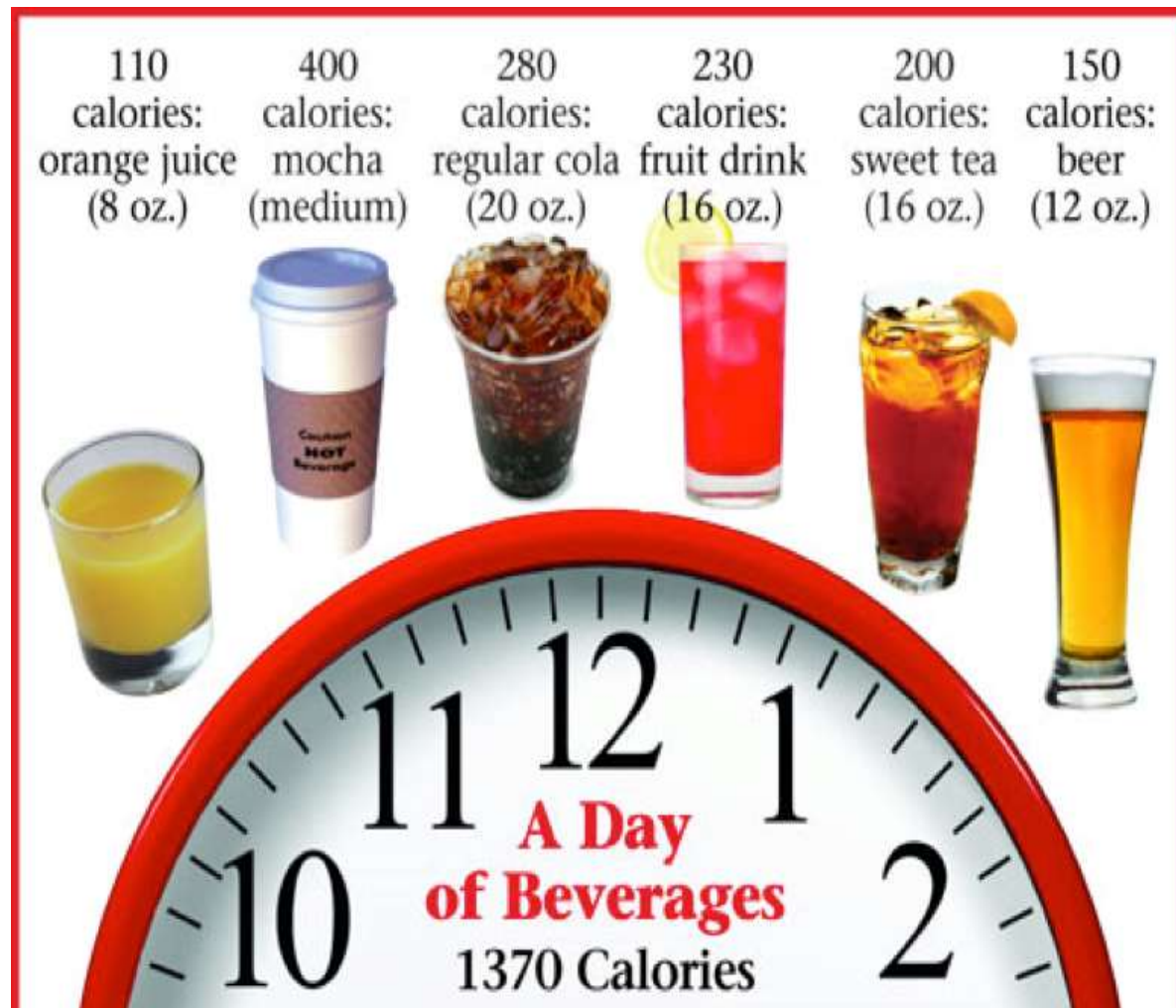


Figure 1

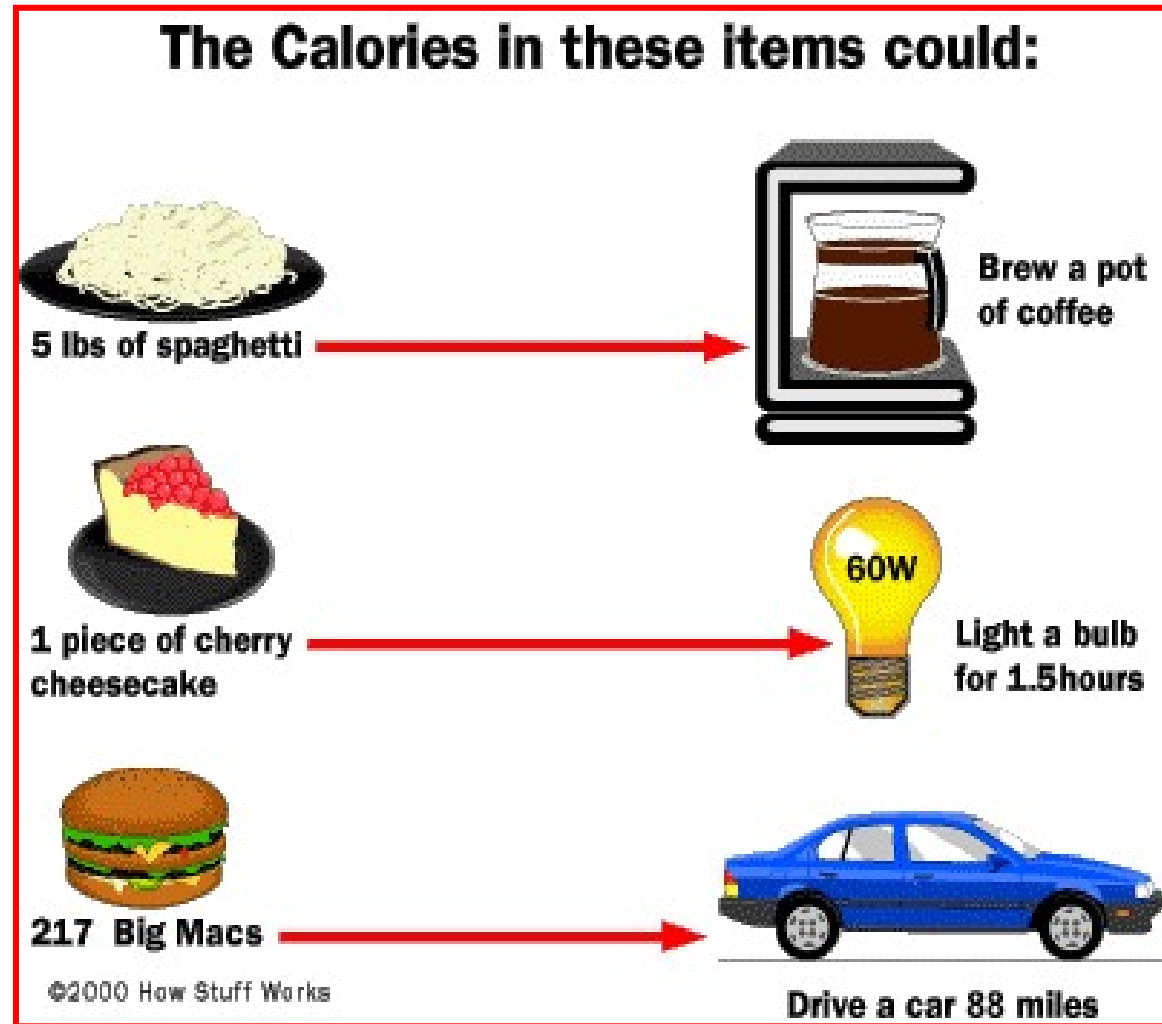
Chemical Energy & Food

- Chemical energy in food is measured in calories
- Calorie – amount of energy needed to raise the temp. of 1 gram of water by 1 degree Celsius



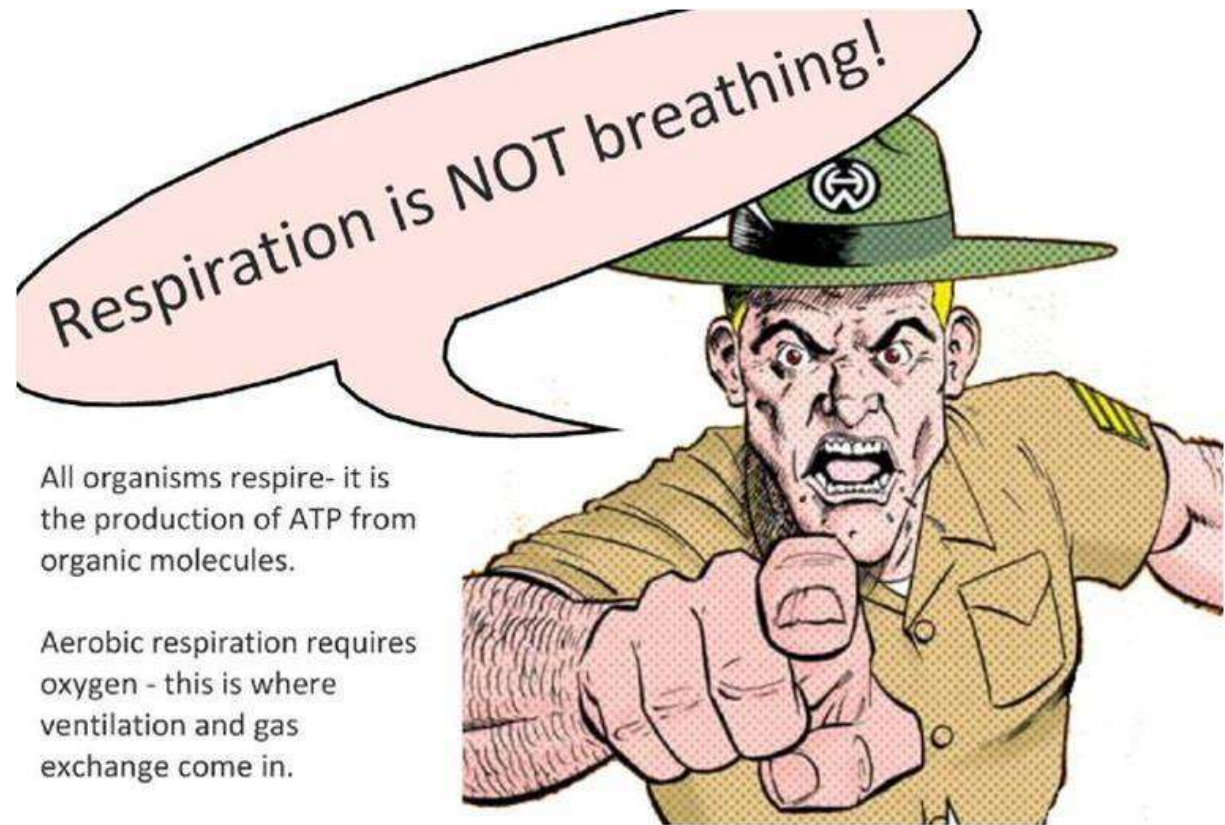
Chemical Energy & Food

- ★ Chemical energy stored in food (glucose) is released by breaking chemical bonds during cellular respiration
- Released energy is used to build ATP



Cellular Respiration

- May or may NOT require oxygen (2 types)
- occurs in the mitochondria (cytoplasm in anaerobic cells)



Aerobic Cellular Respiration

- OXYGEN is required!
- Occurs in the mitochondria and cytoplasm

Equation:

Glucose + Oxygen \longrightarrow Carbon dioxide + Water + **ENERGY**



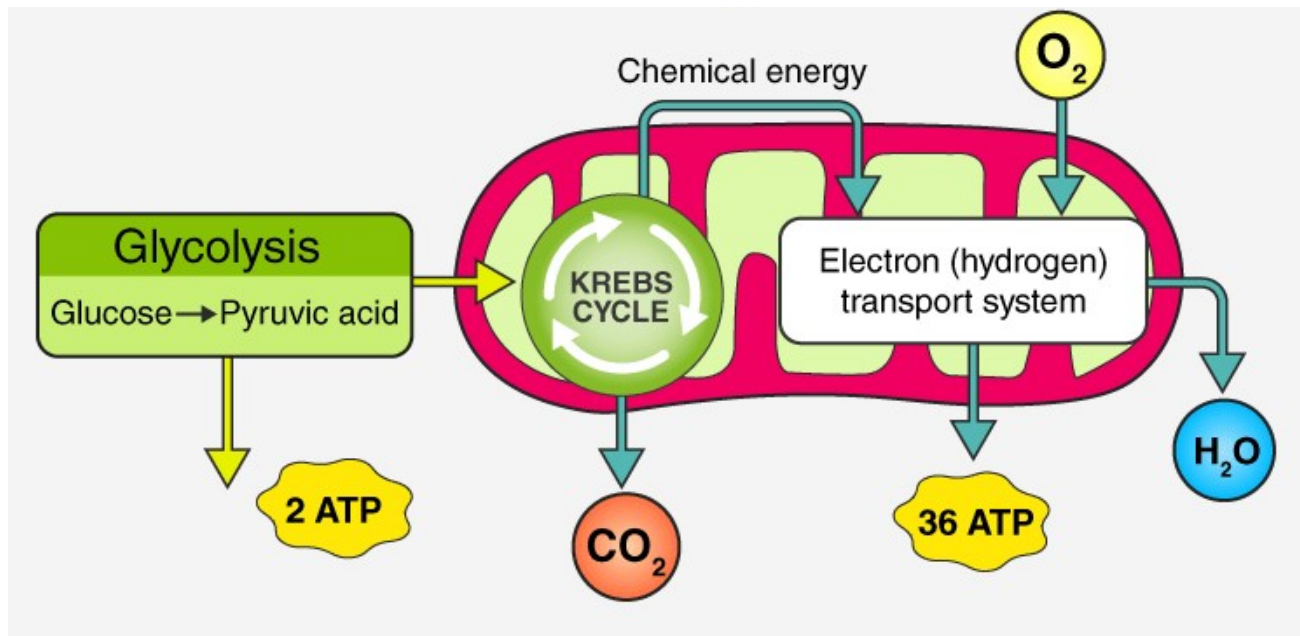
- Yields a net gain of 36 ATP (38 made, 2 are used to start the reaction) for each glucose molecule broken down

- Energy is released a little at a time through 3 sets of complex reactions

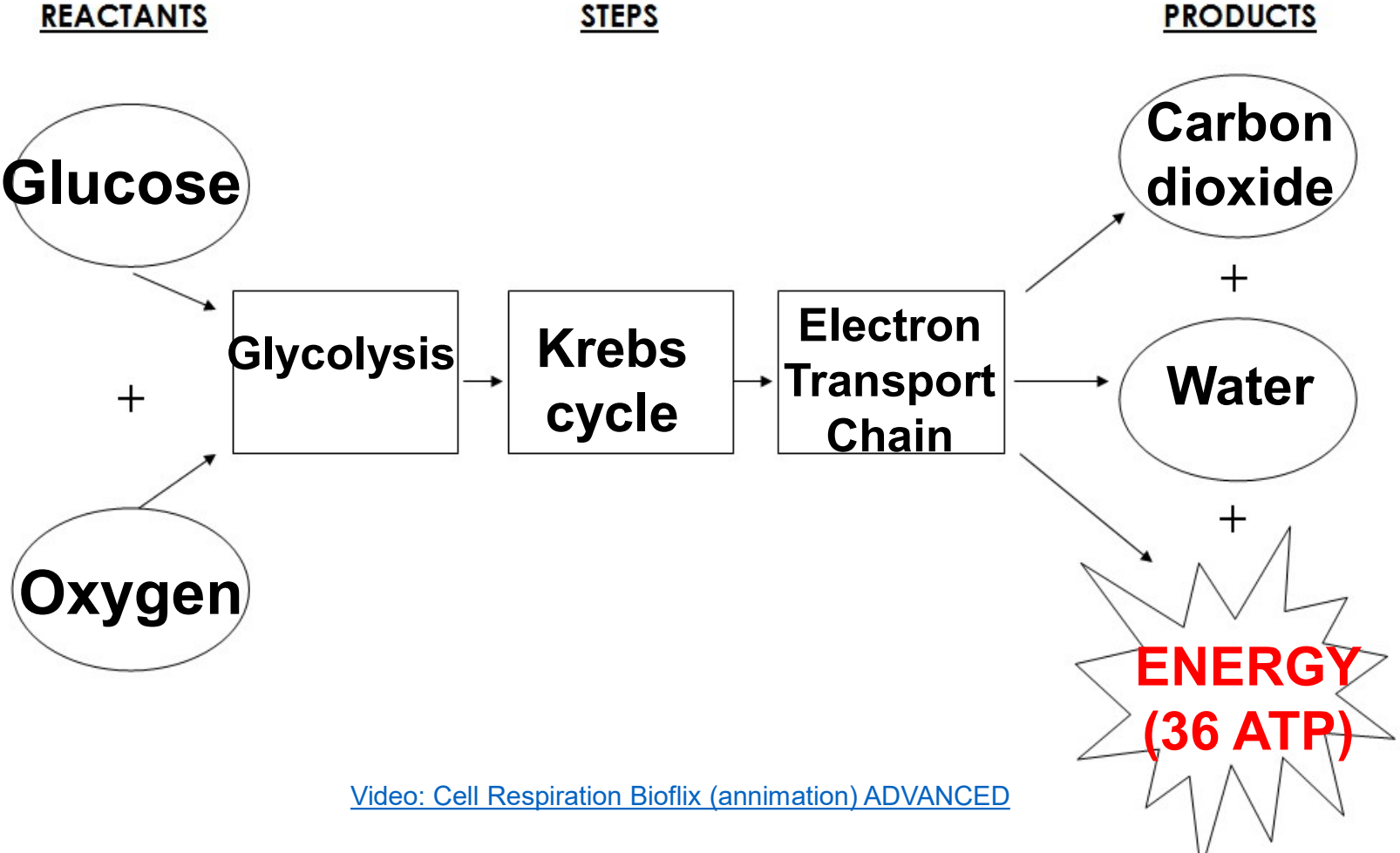
1) Glycolysis (in cytoplasm)

2) Krebs Cycle

3) Electron Transport Chain

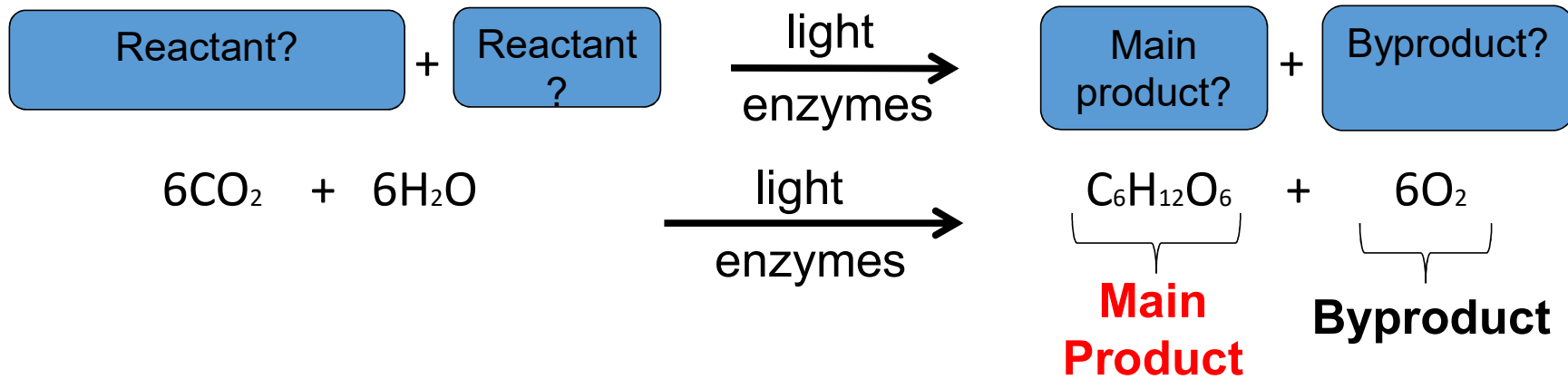


Aerobic Respiration Flowchart

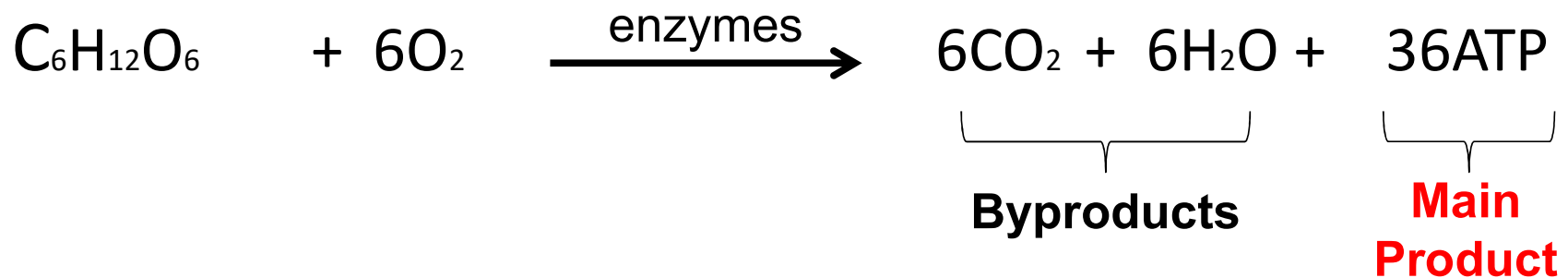


[Video: Cell Respiration Bioflix \(animation\) ADVANCED](#)

Photosynthesis Equation Review



Photosynthesis is the **OPPOSITE** of Aerobic Respiration



Photosynthesis

Main Job:

**Autotrophic nutrition,
Produces food (glucose)**

Who does it?:

Autotrophs (plants & algae)

Reactants (what it needs):

**$\text{CO}_2 + \text{H}_2\text{O} + \text{sunlight}$
(carbon dioxide + water)**

Products (what it makes):

**$\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$
(glucose + oxygen)**

Where in the cell?

chloroplasts

Aerobic Respiration

Main Job:

**Releases energy from bonds
of food to produce ATP**

Who does it?:

**all living things
(including autotrophs)**

Reactants (what it needs):

**$\text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$
(glucose + oxygen)**

Products (what it makes):

**$\text{CO}_2 + \text{H}_2\text{O} + \text{ATP}$
(carbon dioxide, water,
energy)**

Where in the cell?

mitochondria

BOTH

**Chem.
reactions (need
enzymes)**

**Performed by
autotrophs**

**Maintain
homeostasis**

**Require
energy**