

How do we get the energy that we require to carry out our everyday activities?

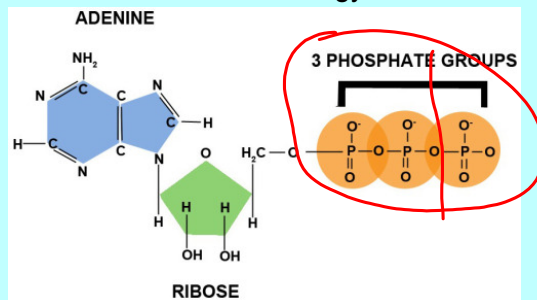
Food - carbohydrates (Starches
↓
Sugars)
- protein
- Fat

Lesson 6 Cellular Respiration.notebook

<https://www.youtube.com/watch?v=Gh2P5CmCC0M>

Cellular Respiration

- occurs mostly in the mitochondria of living cells/first part does occur in cytoplasm
- food(nutrients) are gradually broken down to provide the cell energy...you don't "burn" your food directly
- its like changing a \$5 bill into 2 toonies and a loonie so you can use the pop machine
- glucose (sugar) provides most of the energy needed, but needs to be converted into ATP (adenosine triphosphate) first.
- think of ATP as a rechargeable battery that releases small amounts of energy when your cells need it
- when ATP releases energy it becomes ADP



Cellular Respiration is a 3 step process

Step 1 **Glycolysis** occurs in the cytoplasm

- $C_6H_{12}O_6$ (glucose) is broken down into 2, 3 carbon compounds called Pyruvate ($C_3H_6O_3$) and electrons will be released

NADPH

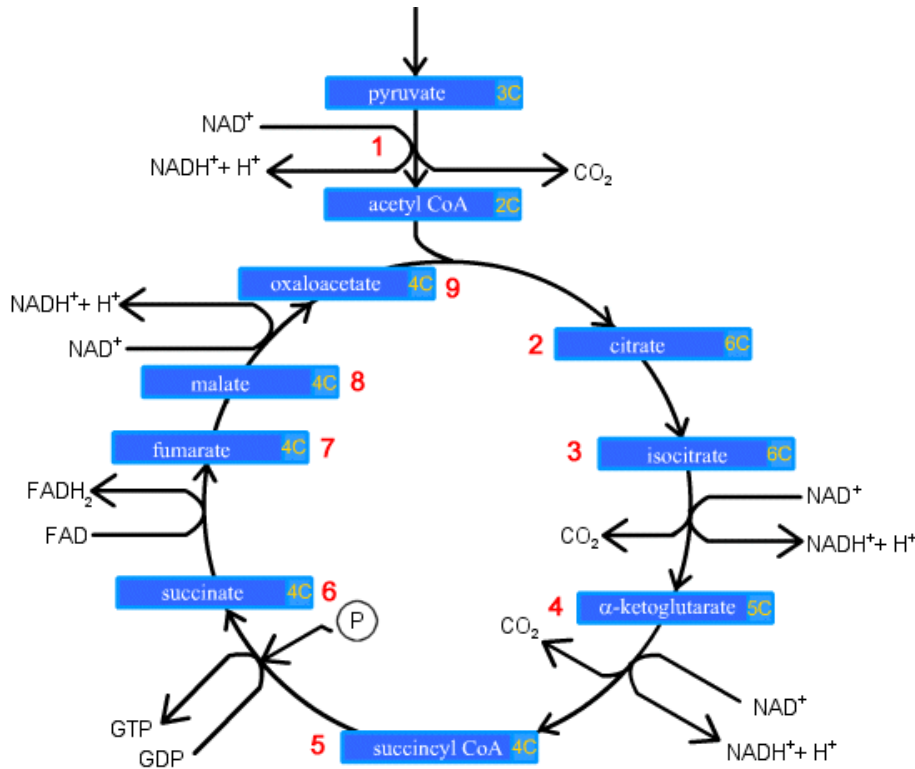
- A molecule called NAD~~P~~**H** accepts the electrons for use later
- NADP is found inside the mitochondria
- 2 ATP molecules are also produced

(this can be done anaerobically as well and lactic acid is produced)



- like splitting kindling before starting a fire
- occurs outside the stove

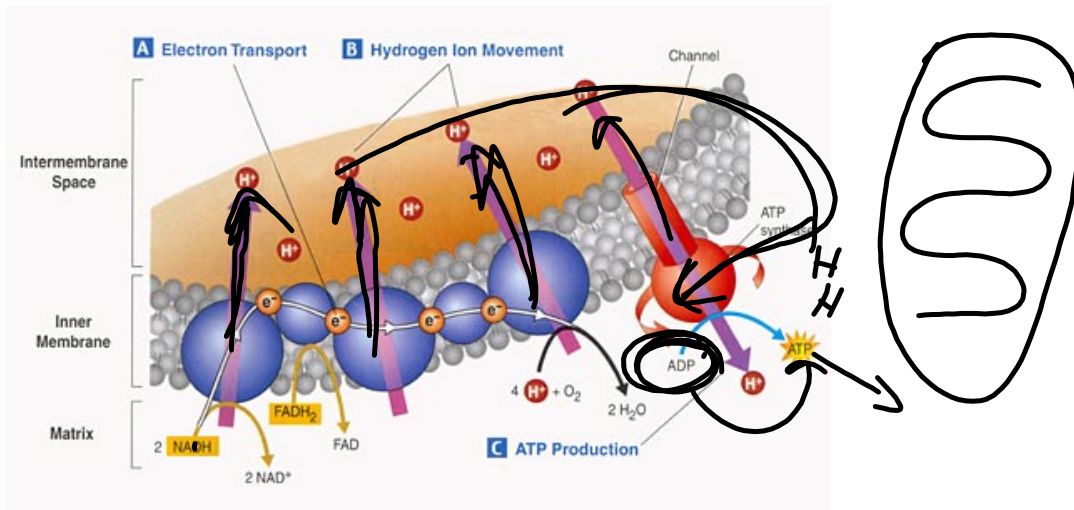
Step 2 The Krebs Cycle



- in more simple terms.....
- the Krebs cycle occurs in the mitochondria
- pyruvate is converted into acetyl CoA which is a 2 carbon compound
- the missing C in the form of CO_2
- some high energy electrons are also created and held by NADH and FADH
- lastly water is created as oxygen enters the mitochondria and accepts some hydrogen ions

Step 3 Electron Transport Chain

- the electrons stored in NADH and FADH will be released
- they will travel through the electron transport chain and cause a release of hydrogen protons to the outside of the mitochondria's matrix

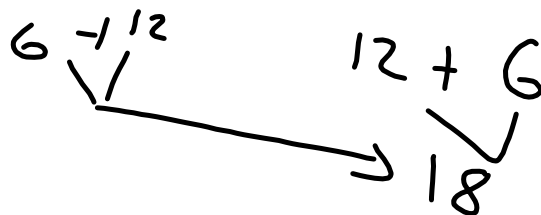
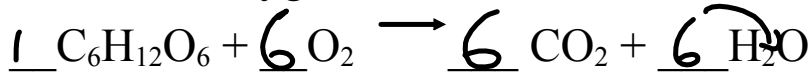


- as the hydrogen build up they diffuse through ATP synthase (a protein channel) and are used to re-charge ADP into ATP



- after losing a P , ATP becomes ADP which must be recharged again using the charged up electrons and the H⁺ ions.

Formula: **reactants** **products**
 Glucose + Oxygen \longrightarrow Carbon Dioxide + Water



Lesson 6 Cellular Respiration.notebook

1. What type of food needs to be consumed to provide you with energy?
2. What type of organisms go through cellular respiration?
3. Where does cellular respiration occur?
4. What is food converted into to provide you with energy?
5. How many steps are there in cellular respiration? What is the name of the first one?