

## Science Study Guide #4

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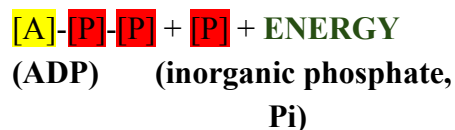
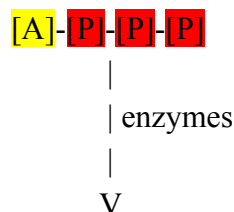
**PLEASE, DO NOT LOSE THIS STUDY GUIDE AND REMEMBER TO STILL STUDY YOUR NOTES! I DO NOT KNOW WHAT IS ON THE TEST AND ALL INFORMATION INSIDE IS INCLUDED BASED ON PURE SPECULATION. I AM NOT RESPONSIBLE FOR ANY IRRELEVANT, MISLEADING OR OTHERWISE FALSE INFORMATION!**

### THE FOUNTAIN OF ENERGY (Glucose)

- Glucose,  $C_6H_{12}O_6$
- What is the mass of one molecule of Glucose? **180 amu | 180 g/mol**
- How many atoms are in one molecule of glucose? **24 atoms**
- If Glucose is the energy source for animals, what is the energy source in our solar system? **The Sun**
- We eat to consume sugar.
- And we **store** that energy in the form of ATP (Adenosine Triphosphate)

### ADENOSINE TRIPHOSPHATE, ATP

- **ATP**
- **Adenosine**
- Made up of a 5 carbon sugar, *ribose*
- And *Adenine*, a base
- **TP**
- **Triphosphate**



**Why was the third bond broken? Because it's the easiest to break and it has the most energy**

- All this generation of energy is happening in what organelle?
- What specific area of the mitochondria? **Cristae**

**1-29-19**

- This cellular process is called cellular respiration
- It's how the cell *generates* energy

### Cellular Respiration

Enzyme (animals)

ATP  $\rightleftharpoons$  ADP+pi+Energy

Enzyme (plants) (reversible)

- Breaking bonds (catabolic reaction)
- Creating bonds (anabolic reaction)
- Breaking and form bonds=*metabolism*
- Plants (producers) obtain their energy from the sun
- Animals (consumers) obtain their energy from food
- Autotrophs- make their own food; Auto- self
- Heterotrophs- consume food; troph- food; hetero- other
- Which humans are humans? **Heterotroph and animals**
- **REVIEW**: what's the difference between physical change and a chemical change?

### MITOCHONDRIA & CHLOROPLAST

#### **LIGHT DEPENDENT VS. LIGHT INDEPENDENT REACTIONS**

- Light dependent require light, independent dont require light
- Light dependent reaction (in thylakoids/grana)  
 $\text{Light} + \text{H}_2\text{O} \rightarrow \text{O}_2 + \text{ATP} + \text{H}^+$   
Proton
- Light independent reaction (in stoma) "gell"  
 $\text{ATP} + \text{CO}_2 \rightarrow \text{Glucose} + \text{H}_2\text{O}$
- We use this reaction so the plant can continue to work in the absence of light
- Both reactions are happening in the chloroplast

#### PHOTOSYNTHESIS

- Combine *light dependent* and *Independent reactions*
- photo=?
- synthesis=?
- Photo im *light dependent* reactions and synthesis in light independent reaction
- $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2$  **ANSWER**  $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$

#### Energy cycle

- Plants:  $\text{Energy} + \text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6$
- Animals:  $\text{Energy} + \text{CO}_2 + \text{H}_2\text{O} \leftarrow \text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6$

## Greenhouse and green house effect

### REVIEW

- What do we breath? Air
- Of what is the air mostly made of? Nitrogen
- Are we aerobic or anaerobic organisms?

### FERMENTATION

- It is another way to generate energy
- It is a very primitive method of generation ATP
- Question: why do we use it? When we dont need oxygen
- Method of generating energy in case of making “emergency”
- Doesn't last long, produces lactic acid
- Fermentation happens in the cytoplasm

### 2 FORMS OF FERMENTATION

- $C_6H_{12}O_6 \rightarrow 2C_3H_6O_3 + 2ATP$

### ANOTHER FORM OF FERMENTATION

- Alcoholic fermentation
- $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + CO_2 + 2ATP$
- Ethyl alcohol is the form of alcohol you can drink safely
- Occurs in anaerobic environment