**Cell Energy, Photosynthesis, and Cellular Respiration**

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| **INTRODUCTION** | | | | | |
| Energy for most living things comes from \_\_\_\_\_\_\_\_. That energy comes from the sun. |  | Organisms that use \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ from the sun to produce food are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Example: \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |  | Organism that cannot make their own food are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  Example: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and most microorganisms |
| **ENERGY** | | | | | |
| A special kind of molecule used by cells to store and transport energy is called \_\_\_\_\_\_\_\_\_. | \_\_\_\_\_\_\_\_\_\_=  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | ATP transfers energy from the \_\_\_\_\_\_\_\_\_\_\_\_ of food molecules to cell processes. | **The parts of an ATP molecule:** | |
| All energy is stored in the \_\_\_\_\_\_\_\_\_\_\_\_ of molecules—breaking the bond releases the energy.  When the cell has energy available it can store this energy by adding a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_group to a molecule called ADP, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  When the cell needs energy, the \_\_\_\_\_\_ phosphate bond is broken. A burst of energy is \_\_\_\_\_\_\_\_\_\_\_\_\_, and ATP \_\_\_\_\_\_\_\_\_\_\_\_\_\_back to ADP. | | | + \_\_\_\_\_\_\_\_\_= ATP **Energy is stored.**  \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_  Circle the part of the molecule in both diagrams where the energy is stored or released from within the molecule.    ATP- \_\_\_\_= \_\_\_\_\_\_\_\_\_\_\_\_ + **Energy is released.** | | |
| Energy is replaced when the phosphate is added back to **ADP** to make it **ATP** again. | | | | The energy to do this comes from molecules in foods,  like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. | |

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| **PHOTOSYNTHESIS** | | | | | |
| **Technical Definition:**  Photosynthesis is the process by which the energy of **\_\_\_\_\_\_\_\_\_\_\_**is **\_\_\_\_\_\_\_\_\_\_\_\_**into the energy of \_\_\_\_\_\_\_\_\_\_\_\_\_or sugar. |  | Photosynthesis occurs in the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**of plants (That’s an organelle!!)  Plants gather the sun’s energy with light absorbing molecules called \_\_\_\_\_\_\_\_\_\_\_.  The pigment that \_\_\_\_\_\_\_\_\_\_\_light for photosynthesis is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |  | 1961- American chemist \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  received the Nobel prize for  figuring out the  chemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  used by plants to make sugar | |
| **General formula for photosynthesis:** | | carbon dioxide + water + light 🡪 glucose + oxygen **CIRCLE the reactants**  **OR and BOX the products**  **in both expressions**  6CO2  + 6H2O + light 🡪 C6H12O6  + 6O2 | | | |
| **Photosynthesis has 2 Parts** | | | | | |
| LIGHT DEPENDENT REACTIONS  (\_\_\_\_\_\_\_\_\_\_light  1. Energy from \_\_\_\_\_\_\_\_\_\_\_\_\_is absorbed by chlorophyll.  2. H2O is broken down and \_\_\_\_\_\_\_\_\_\_\_\_\_is released  3. Energy in the form of \_\_\_\_\_\_is made | The light dependent and the  light independent  are **BOTH** necessary  for photosynthesis to work | | | | LIGHT INDEPENDENT REACTIONS  (\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_light)  1. Carbon dioxide CO2 \_\_\_\_\_\_from the atmosphere is taken in by the plant  2. The energy made in the light- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactions is used to make \_\_\_\_\_\_\_\_\_\_or sugar from the carbon in the CO2.  The light independent reaction is also called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **The Big Picture** | | | | | |
| **PHOTOSYNTHESIS provides** **the \_\_\_\_\_\_\_\_\_\_\_\_\_ we breathe**  **and the \_\_\_\_\_\_\_\_\_\_**  **heterotrophs (like us)** **consume to survive.** | | | | | |
| Vocab: Photo= light Synthesis= to make  Dependent= needs/relies on Independent= does not need/ does not rely on | | | | | |

**Now we know that autotrophs, like green plants, use photosynthesis to trap energy from sunlight to make food/sugar for energy.**

**So what’s next? How do the plants use the food they just created?**

**CELLULAR RESPIRATION**

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| Technical Definition:  Cellular respiration is the process by which the energy of \_\_\_\_\_\_\_\_\_\_\_\_\_is \_\_\_\_\_\_\_\_\_\_\_\_\_\_in the cell to be used for life processes (movement, breathing, blood circulation, etc…) |  | Cells require a constant source of \_\_\_\_\_\_\_\_\_\_ for life processes but keep only a **\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_**of **\_\_\_\_\_\_**on hand. Cells can regenerate ATP as needed by using the energy stored in \_\_\_\_\_\_\_\_\_like glucose. | |  | The energy stored in glucose by photosynthesis is \_\_\_\_\_\_\_\_\_\_\_\_\_by cellular respiration and repackaged into the energy of ATP. | | |
| **General formula for Cellular Respiration:** | [http://cronodon.com/sitebuilder/images/respiration_equation-600x124.jpg](http://www.google.com/url?sa=i&rct=j&q=&esrc=s&frm=1&source=images&cd=&cad=rja&docid=zISSTtDQqk4lVM&tbnid=CiDE1YE4C7BFfM:&ved=0CAUQjRw&url=http://cronodon.com/BioTech/Respiration.html&ei=B8FVUte5Ebjk4AOLuYDgBA&bvm=bv.53760139,d.dmg&psig=AFQjCNFlwWvN8a3Q2VOASvy7UZ80rSTnJw&ust=1381437903211702) | | | |
| The \_\_\_\_\_\_\_\_\_\_\_\_\_in photosynthesis are the same as the \_\_\_\_\_\_\_\_\_\_\_\_\_of cellular respiration. | | | | | | | |
| **There are 2 types of Cellular Respiration:** | | | | Cellular respiration  takes place in  \_\_\_\_\_\_\_ cells. | | | |
| **AEROBIC**  **(With Oxygen)** | | **ANAEROBIC**  **(Without Oxygen)** | | | | | |
| Aerobic cellular respiration requires oxygen.  Occurs in the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of the cell.  Total of **\_\_\_\_\_\_\_\_\_\_\_\_**molecules produced. | |  | Occurs when **\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**is available to the cell (2 kinds: Alcoholic and Lactic Acid)  Also called**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  Much \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_produced than in aerobic respiration. | | | | |
|  | | | **\_\_\_\_\_\_\_\_\_\_\_\_\_** fermentation—occurs in **\_\_\_\_\_\_\_\_\_\_\_\_\_**and **\_\_\_\_\_\_\_\_**  Process used in the **\_\_\_\_\_\_\_\_\_\_\_\_**and **\_\_\_\_\_\_\_\_\_\_\_\_\_** industry—yeast produces CO2 **\_\_\_\_**during fermentation to make dough **\_\_\_\_\_\_\_\_\_\_\_**and give bread its holes.  C:\Users\lawrimore.cassie\Desktop\OH fermentation.jpgYeast + glucose = ethanol + CO2 gas + 2 ATP | | | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  fermentation—occurs in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  Lactic acid is produced in the muscles during rapid **\_\_\_\_\_\_\_\_\_\_\_\_\_**when the body **\_\_\_\_\_\_\_\_\_\_**supply enough **\_\_\_\_\_\_\_\_\_\_\_\_\_**to the**\_\_\_\_\_\_\_\_\_\_\_\_\_\_**—causes burningsensation in muscles | |
|  | | | | Vocab: Aero=oxygen/air  A/An= Without |