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

|  |
| --- |
| **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 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  |

|  |
| --- |
| **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 thechemical \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 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(\_\_\_\_\_\_\_\_\_\_light1. Energy from \_\_\_\_\_\_\_\_\_\_\_\_\_is absorbed by chlorophyll.2. H2O is broken down and \_\_\_\_\_\_\_\_\_\_\_\_\_is released3. 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 plant2. 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**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 |
| The \_\_\_\_\_\_\_\_\_\_\_\_\_in photosynthesis are the same as the \_\_\_\_\_\_\_\_\_\_\_\_\_of cellular respiration. |
|  **There are 2 types of Cellular Respiration:** | Cellular respirationtakes 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  |