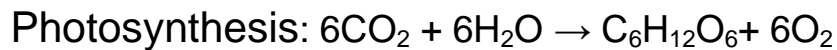
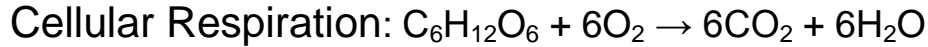


# Lab: "The Circle of Life"

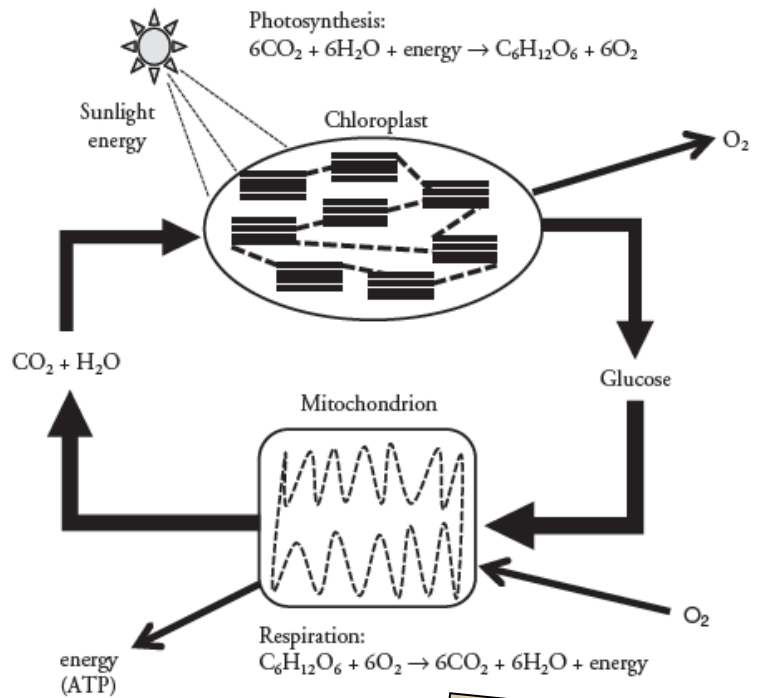
## HONORS BIOLOGY: UNIT 3

**BACKGROUND:** Photosynthesis and cellular respiration are connected through an important relationship. This relationship enables life to survive as we know it. The products of one process are the reactants of the other. Notice that the equation for cellular respiration is the direct opposite of photosynthesis:



**Photosynthesis** makes the glucose that is used in **cellular respiration** to make ATP. The glucose is then turned back into carbon dioxide, which is used in photosynthesis. While water is broken down to form oxygen during photosynthesis, in cellular respiration oxygen is combined with hydrogen to form water. While photosynthesis requires carbon dioxide and releases oxygen, cellular respiration requires oxygen and releases carbon dioxide. It is the released oxygen that is used by us and most other organisms for cellular respiration. We breathe in that oxygen, which is carried through our blood to all our cells. In our cells, oxygen allows cellular respiration to proceed. Cellular respiration works best in the presence of oxygen. Without oxygen, much less ATP would be produced.

Cellular respiration and photosynthesis are important parts of the **carbon cycle**. The carbon cycle is the pathways through which carbon is recycled in the biosphere. While cellular respiration releases carbon dioxide into the environment, photosynthesis pulls carbon dioxide out of the atmosphere. The exchange of carbon dioxide and oxygen during photosynthesis and cellular respiration worldwide helps to keep atmospheric oxygen and carbon dioxide at stable levels. (from: <https://www.ck12.org/biology/cellular-respiration-and-photosynthesis/lesson/>)



**OBJECTIVE:**

To enhance your understanding of the important relationship between photosynthesis and cellular respiration through the completion of a **fully illustrated children's' book**. Think of some of the stories you were told when you were young. It can take the form of an ancient Aesop's fable, to something like Dr. Zeus. Accuracy is critical and creativity is extremely encouraged!



# GUIDELINES:

- Create a **rough draft** on separate paper of your storyline before you begin drawing in your booklet provided by the teacher. Include **text** and proposed **illustrations/diagrams**. This will be turned in with your final book and will make up 10% of your project grade.
- Design children's book **USING:**
  1. **Words:** Your book must teach/inform children about the important relationship between photosynthesis and cellular respiration and how it regulates life on Earth.
    - a. Story must include the following **terms (10)**: photosynthesis, cellular respiration, carbon cycle, chloroplasts, mitochondria, oxygen, carbon dioxide, water (H<sub>2</sub>O), sugar (glucose), and energy. *(Feel free to add others)*
    - b. Story must include and explain the following **concepts (4)**: photosynthesis, cellular respiration, carbon cycle (*pathways*), and The Law of Conservation of Energy.
  2. **Illustrations or Diagrams (6 minimum):** You must include original illustrations/diagrams to help teach and tell your story.
  3. A **cohesive story line** that is scientifically accurate and age appropriate.
- Your book must **INCLUDE** the following:
  1. A **Table of Contents** (*located on page 1*) showing "chapters" in your book. (*you can figure out how to break-up your storyline into "chunks" that make sense*) Be creative with chapter titles. Must include at least **4 chapters**.
  2. A **scientifically accurate explanation** of the interdependence of the processes of photosynthesis and cellular respiration and their importance to life on Earth (*autotrophs and heterotrophs*).
    - a. Include important **illustrations/diagrams (minimum of 6)** of the relationships and processes. (*Use "artistic license" and feel free to use metaphors, symbols, etc., to represent important "places" and/or processes*)
    - b. Feel free to create "**characters/names**" for "major players" (*e.g. leaves, chloroplasts, mitochondria, the sun, plants/animals, ATP, glucose, etc., etc., to help tell your story.*)
    - c. A **5 question short fill-in-the-blank quiz** must be included on last page of your book. A separate **key to your quiz** must also be given to your teacher.
  3. Include a **child friendly explanation** of the **science topics**.
    - a. You must present the science information in words that a 8-12 year-old child could understand.
    - b. Your book must be well organized and **easy to understand**.
  4. You will be provided with a **staple-bound book** with 20 pages (**5 ½ " x 8 ½ "**). Pages will be pre-numbered.
    - a. Your story (*including Table of Contents and Quiz*) must be a **minimum 15 pages** in length but **no more than 20 total pages**.
    - b. Your book must include a **minimum of 6 original diagrams or illustrations**.
  5. Make sure your book is original. **Be creative!** Have fun with the project.



## GRADING RUBRIC:

- **Rough Draft**  
Well-organized with text and illustration ideas. (10 points) \_\_\_\_\_
- **Scientifically Accurate**  
Clear, concise, well-organized description of the assigned vocabulary and concepts. (20 points) \_\_\_\_\_
- **Complete**  
Story to include listed vocabulary and concepts, illustrations and diagrams, minimum 4 chapters in length, quiz and key, and a creative and cohesive storyline (*everything ties together*). (20 points) \_\_\_\_\_
- **Age Appropriate**  
Your explanation of the topic must be appropriate for an 8–12 year-old child. (20 points) \_\_\_\_\_
- **Creativity**  
Your book must be appealing and engaging to a child. (20 points) \_\_\_\_\_
- **Neatness/Effort**  
Take pride in your work! (10 points) \_\_\_\_\_

**TOTAL (100 POINTS)** \_\_\_\_\_