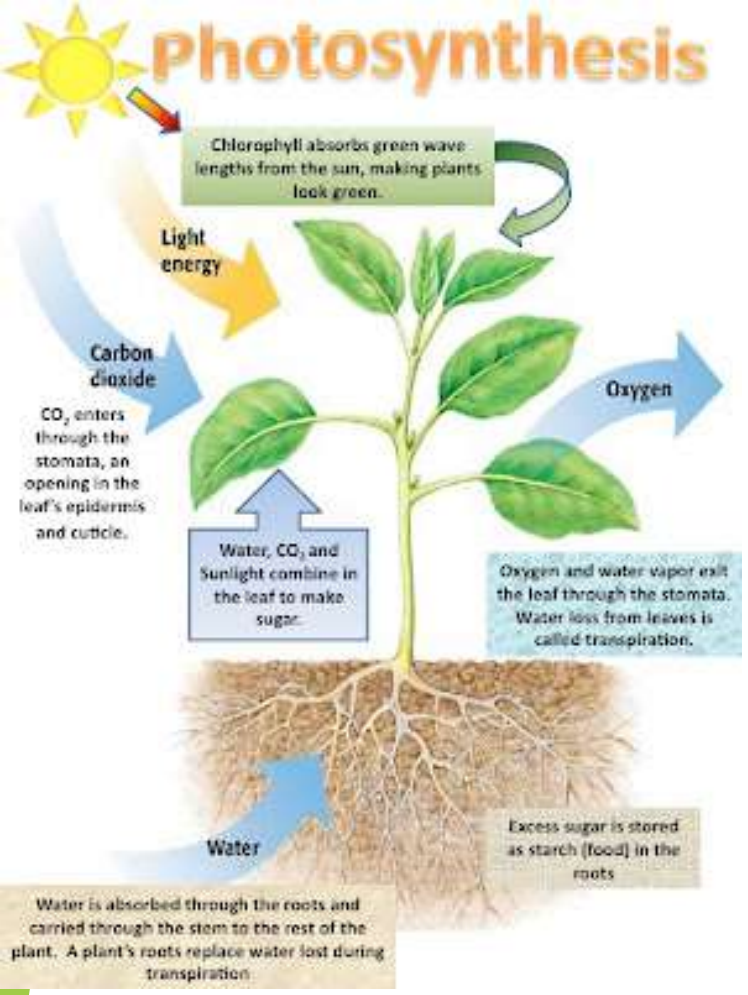
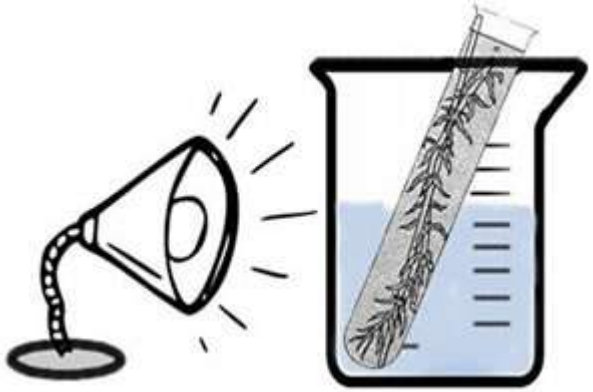
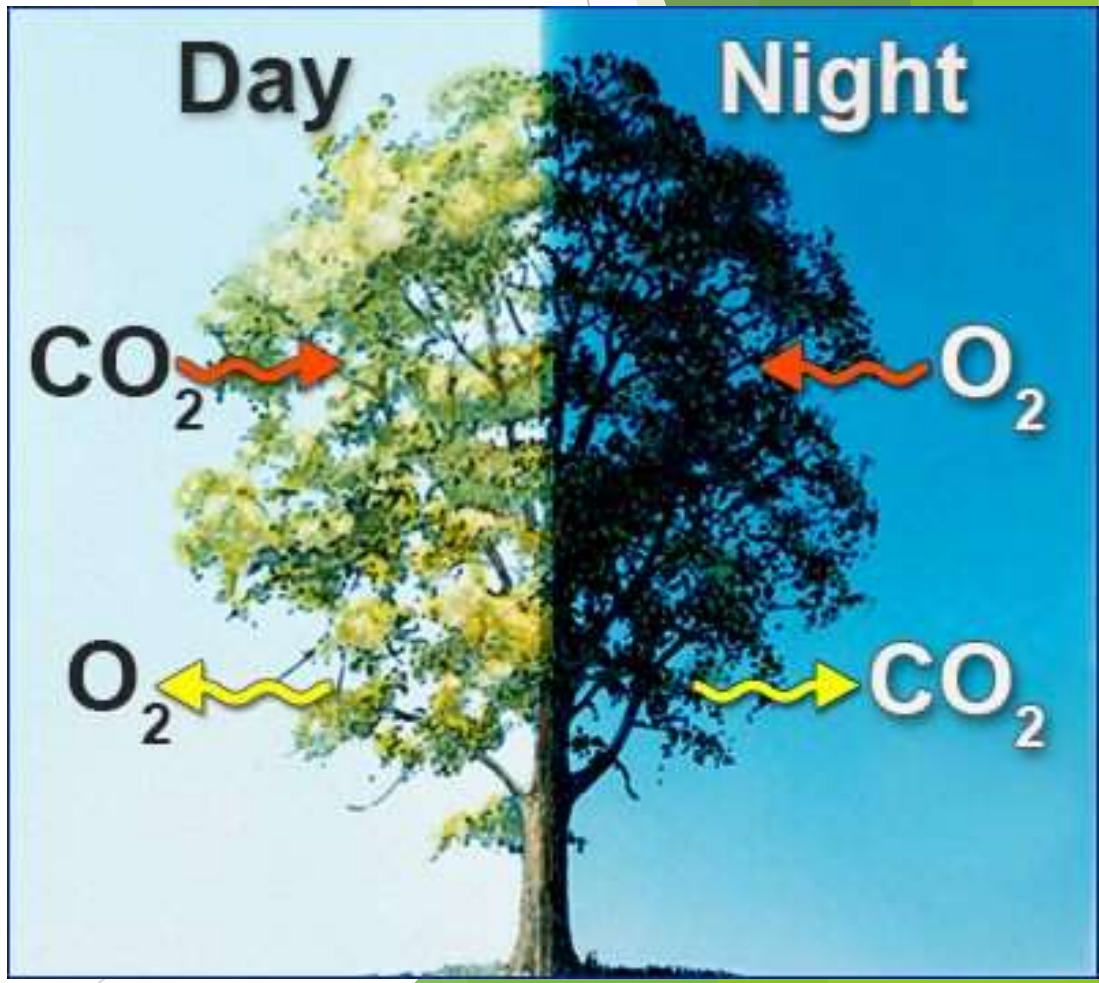
Lab: The Carbon Cycle

Elodea: Photosynthesis vs. Respiration







Pre-Lab Questions

1. What element determines whether an object is considered living or nonliving?
   Carbon

2. What is photosynthesis?
   Plants take in energy from sunlight and convert CO_2 and H_2O into food (sugar) and Oxygen

3. What is respiration?
   Releases the energy contained in sugars for use in metabolism and changes sugars into CO_2

4. What organisms can carry out photosynthesis?
   Algae, Phytoplankton, leaves in plants

5. How do the process of photosynthesis and respiration fit into the Carbon Cycle?
   Photosynthesis turns CO_2 into Oxygen
   Respiration turns Sugars and Oxygen into CO_2

6. Using the Fact Sheet provided fill in the blanks using the following terms: Base, Acid, Neutral
   pH of 1 = Acid pH of 7 = Neutral pH of 14 = Base

Bromthymol Blue (BTB)

- Chemical substance mainly used as an indicator for acid or bases. It can indirectly measure the amount of CO2 in a solution.
- When placed into a liquid substance, it will turn yellow in acid solutions and blue with base solutions…
- In a test tube, you will see that:

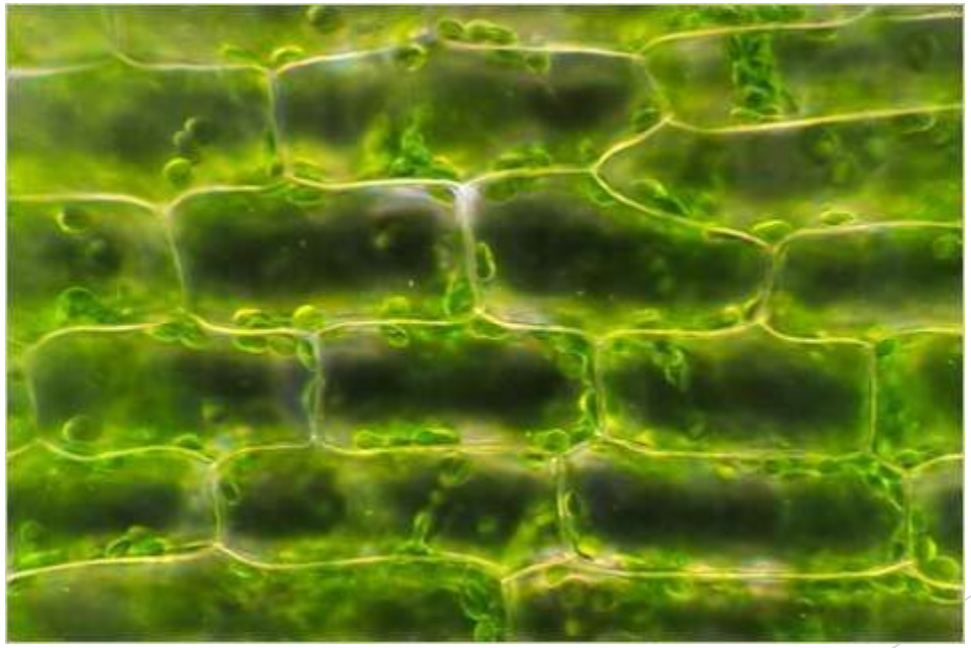
bromothymol blue + CO_2 = yellow/*green color*

(carbonic acid)

bromothymol blue + O_2 = *blue color*

Elodea

- Aquatic plant
- Typically used in aquariums as vegetation
- Elodea plant leafs release large amounts of oxygen into the water
- In this lab we used distilled water because it is Neutral on the pH scale…



Photosynthesis vs. Respiration

- Biology plays an important role in the movement of carbon between land, ocean, and atmosphere through the processes of photosynthesis and respiration.
- Virtually all multicellular life on Earth depends on the production of sugars from sunlight and carbon dioxide (photosynthesis) and the metabolic breakdown (respiration) of those sugars to produce the energy needed for movement, growth, and reproduction.

- Plants take in carbon dioxide (CO2) from the atmosphere during photosynthesis…

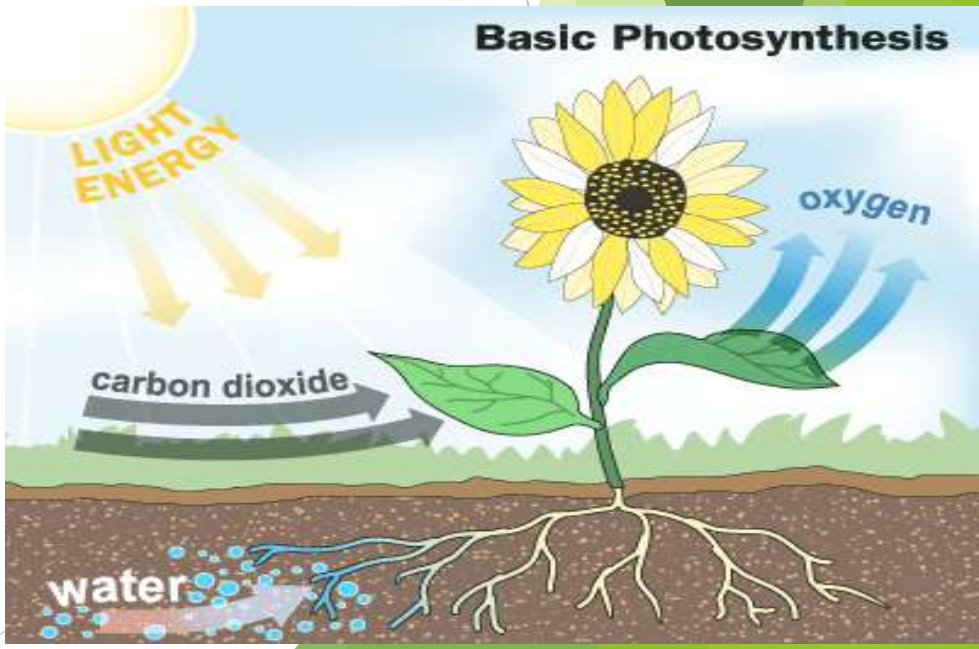
  Photosynthesis:

  Energy (sunlight) + $6CO_2$ + H_2O $C_6H_{12}O_6$ + $6O_2$

- Plants release CO2 back into the atmosphere during respiration through the following chemical reactions:

  Respiration:

  $C_6H_{12}O_6$ (sugar) + $6O_2$ $6CO_2$ + 6 H_2O + energy



Elodea + BTB + Distilled Water

http://youtu.be/dLk7bhQaN5U

http://youtu.be/Ah25ihpfzJA

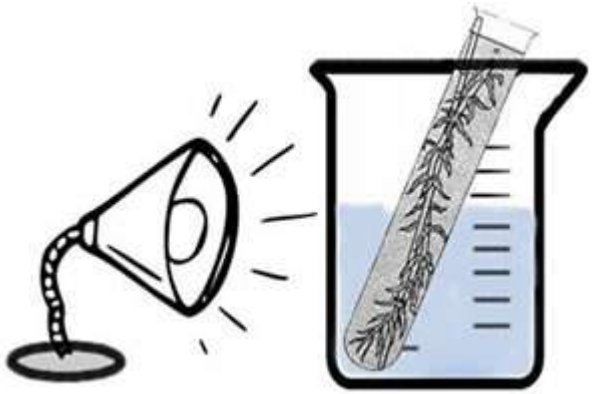
Beginning of lab…

*Half the test tubes stayed in the light

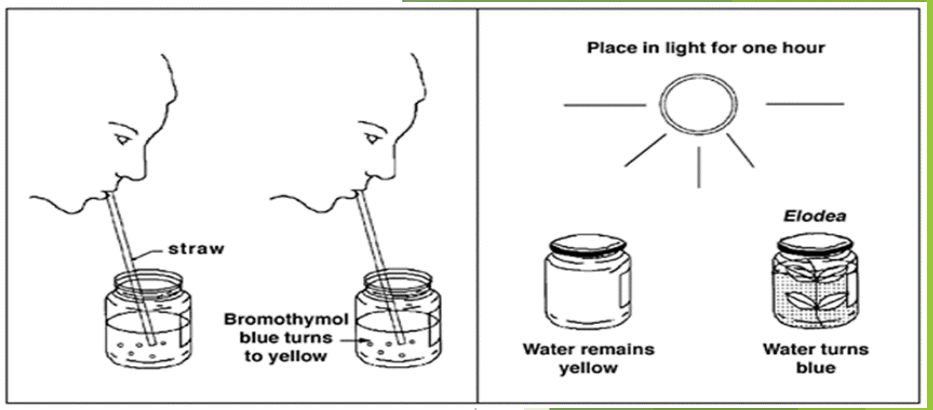
*Half the test tubes stayed in the darkness

3 days pass…

https://youtu.be/xRMKiLlpATk



Data Table…



	Light	Dark
Day 1	7	7
Day 2	7.5	6.5
Day 3	8.5	4.5

Lab Results…

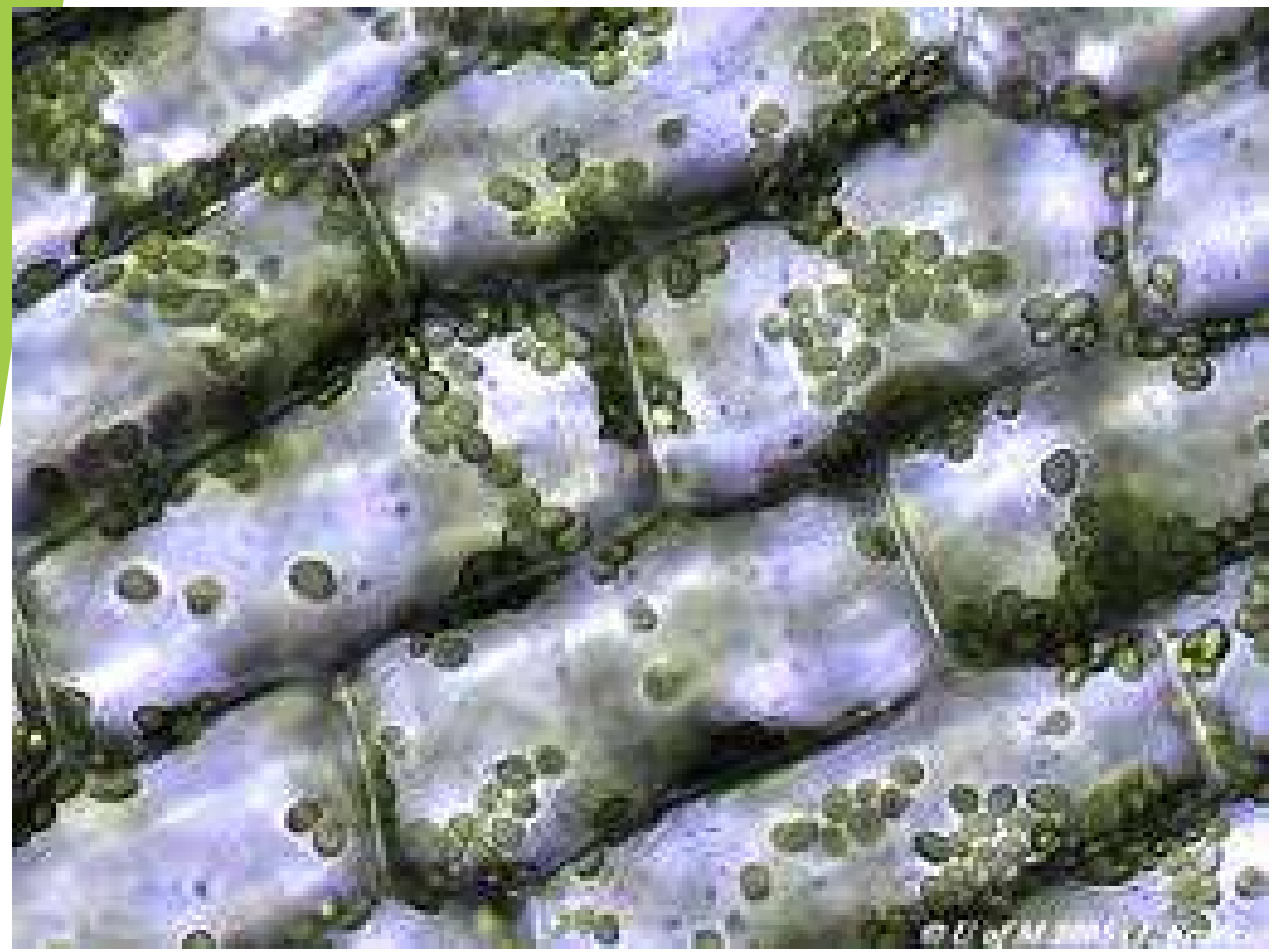
	Light	Dark
Day 1	7	7
Day 2	7.5	6.5
Day 3	8.5	4.5

Light

- Color = Blue
- CO2 – went down
- pH – went up (basic)
- All stages of photosynthesis happen faster than respiration

Dark

- Color = Yellow
- CO2 – went up
- pH – went down (acidic)
- NO photosynthesis, ALL Respiration



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