Photosynthesis PBL

Week of 9/27 AP Biology and Honors Geometry

AP Biology 3.5 Photosynthesis

Enduring Understanding – The highly complex organization of living systems requires constant input of energy and the exchange of macromolecules.

Organisms capture and store energy for use in biological processes— Photosynthesis captures energy from the sun and produces sugars.

The light-dependent reactions of photosynthesis in eukaryotes involve a series of coordinated reaction pathways that capture energy present in light to yield ATP and NADPH, which power the production of organic molecules

During photosynthesis, chlorophylls absorb energy from light, boosting electrons to a higher energy level in photosystems I and II.

Photosystems I and II are embedded in the internal membranes of chloroplasts and are connected by the transfer of higher energy electrons through an electron transport chain (ETC).

When electrons are transferred between molecules in a sequence of reactions as they pass through the ETC, an electrochemical gradient of protons (hydrogen ions) is established across the internal membrane.

The formation of the proton gradient is linked to the synthesis of ATP from ADP and inorganic phosphate via ATP synthase.

The energy captured in the light reactions and transferred to ATP and NADPH powers the production of carbohydrates from carbon dioxide in the Calvin cycle, which occurs in the stroma of the chloroplast.

Honors Geometry:

MGSE9-12.G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

Mathematical Process Standards:

Model With Mathematics

Attend to Precision

**Ask the question:** **How can we determine which factors have the greatest impact on the rate of photosynthesis and transpiration?**

**Research:**

* Part 1 – Pigment chromatography and stomata microscopy
* Part 2 – Floating spinach disks
  + Measure the disks
  + Define your variables
  + Complete the control
  + Complete the experimental group
  + Record data in tables
  + Create graphs
  + Add your data to the google sheets class data
* Part 3 – Transpiration
  + Measure the leaf
  + Define your variables
  + Mrs. Cole/Mrs. Pedersen will complete the control
  + Complete the experimental group
  + Record data in tables
  + Create graphs
  + Add your data to the google sheets class data

**Make your claim:** after class analysis of all the data, make your claim based on the data.

**Summary:** follow the rubric requirements