Lab 10: Photosynthesis

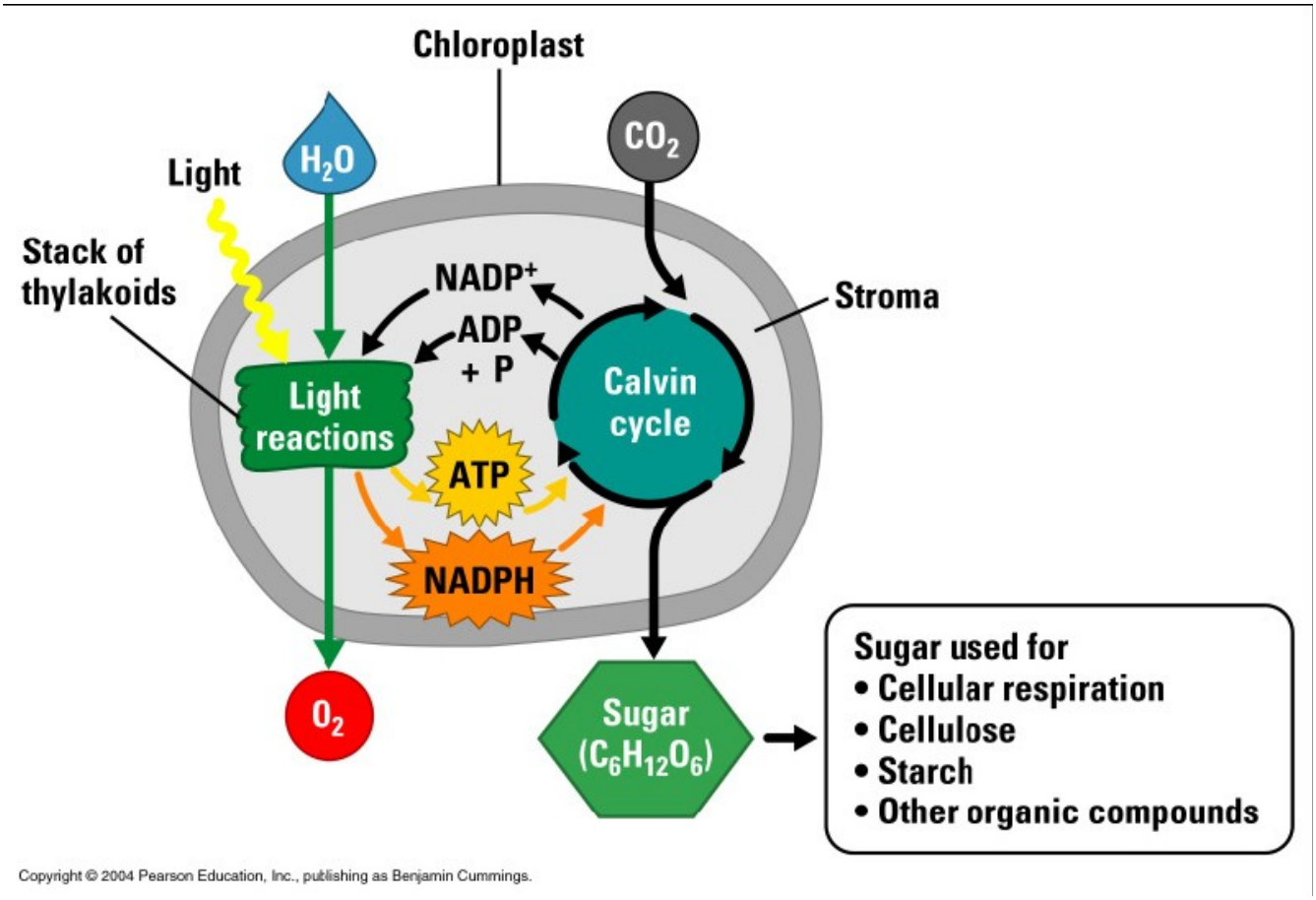
C25-C28

GOALS:

-Understand how plants convert the energy of the sun to energy stored in carbohydrates.
-Identify the two stages of photosynthesis and what occurs during each
-Know the major reactants, products and by-products
-Describe the three experiments and what they illustrate about photosynthesis

KEY TERMS:

chloroplast	stroma	thylakoids l	ight independent
light dependent	chromatography	pigments	carbon fixation
carbohydrates	cellular respiration	calvin cycle	ADP/ATP
$NADP_+$/NADPH	water/oxygen/CO_2	glucose	mitochondria



I. Introduction:

p. C25: Read

II. Experiment 1- Separating plant pigments using paper chromatography:

pp. C25-27: Read, answer questions and follow procedures *precisely*. WEAR GOGGLES when placing your chromatography paper in the jar.

III. Experiment 2 - Effect of light intensity on the rate of photosynthesis:

1-Choose four test tubes of the same size and fill each one half way with sodium bicarbonate ($NaHCO_3$).
2-Cut four healthy *Elodea* tips to a length of 7 cm (or find some already cut) and place one in each of the test tubes until the end is about 1 cm from the top of the test tube.
3-Add $NaHCO_3$ to about 1 cm from the top of the test tube and seal the end of the tube with Parafilm and masking tape.
4-Invert tubes, check for leaks and tap gently on the tube to free any air bubbles trapped in the leaves. You should have a leak-proof tube with an air bubble about 1 cm high trapped in the top.
5-Use a grease pencil to mark the bottom of this bubble.
6-Wrap one tube in aluminum foil to block out any light and place this tube (still inverted) in a rack.
7-Place the other three tubes (still inverted) in the same rack, spaced about 30, 40 and 50 cm from the light source.
8-Turn on light source and wait at least 30 minutes.
9-Tap tubes gently to release any trapped air bubbles and measure the change in the size of the air bubble at the top for all four tubes.

Distance from light (cm)	30	40	50	Dark
Change in size of bubble (mm)				

Q1. What effect does light intensity have on photosynthetic rate? Is this result what you expected?

Q2. How was the photosynthetic rate determined in this experiment?

IV. Experiment 3 – Carbon dioxide fixation:

pp. C27-28: Read, answer questions and follow instructions *precisely*. WEAR GOGGLES when blowing bubbles into the phenol red solution. DO NOT INGEST the phenol red.

V. Lab Summary:

pp. C28: Read and answer all of the summary questions.