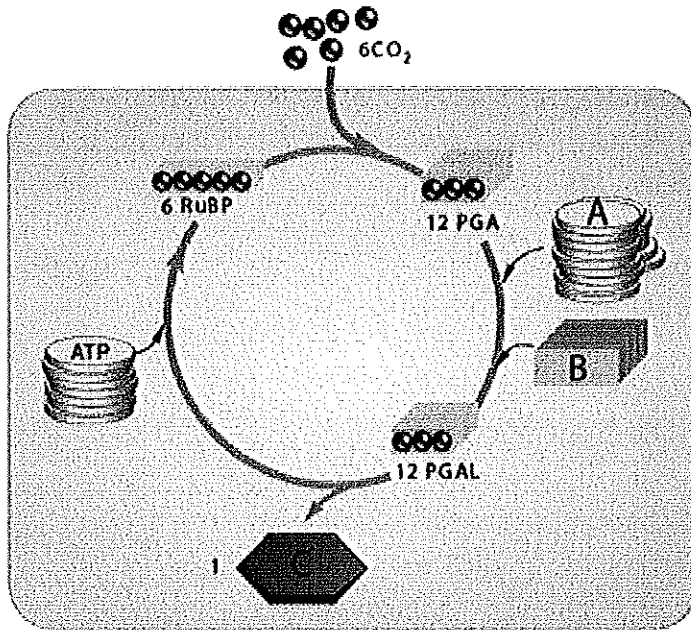
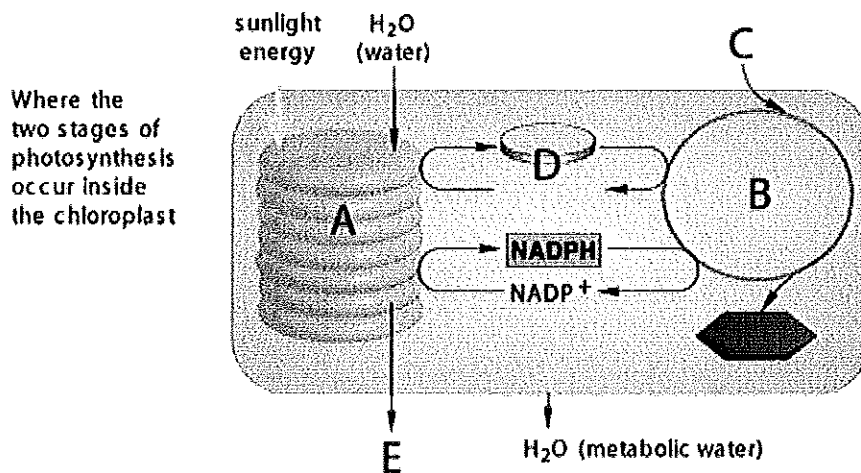


- 1) **All of the following statements are true EXCEPT**
- photons are packages of solar energy.
 - the longer the wavelength of light, the more energy it has.
 - chlorophyll absorbs energy from light.
 - photons with different energy levels produce different colors.
 - visible light is a very small portion of the electromagnetic spectrum.
- 2) **The final hydrogen acceptor in the non-cyclic pathway (light reactions) of ATP formation is**
- FAD.
 - PGA.
 - NADP⁺.
 - FMN.
 - PEP.
- 3) **All but which condition must be present for light-independent reactions to occur?**
- Carbon dioxide is present.
 - The plant is exposed to light.
 - Ribulose biphosphate (RuBP) is present.
 - ATP and NADPH are present.
 - Required enzymes are present.
- 4) **The first stable compound produced from CO₂ in the light-independent reactions is**
- phosphoglycerate (PGA).
 - ribulose biphosphate (RuBP).
 - phosphoglyceraldehyde (PGAL or G3P).
 - glucose.
 - oxaloacetate.
- 5) **The carbon dioxide acceptor in the Calvin-Benson cycle is**
- phosphoglycerate (PGA).
 - ribulose biphosphate (RuBP).
 - phosphoglyceraldehyde (PGAL or G3P).
 - glucose.
 - oxaloacetate.



- 6) Refer to the diagram above for this item. This series of reactions is called...
- glycolysis.
 - light dependent reactions.
 - electron transport chain.
 - Calvin-Benson cycle.
 - Krebs cycle.



Refer to the figure above to answer the next two items.

7) The reactions that produce glucose are represented by the letter _____.

- 8) The reactions at letter "A" are...
- driven by ATP.
 - generating water.
 - using NADPH.
 - dependent on light.
 - called the Calvin-Benson cycle.

9) Plants use sugars as...

- a) a fuel for cellular respiration.
- b) a source of electrons for chemiosmosis.
- c) a fuel for photophosphorylation.
- d) a fuel for cellular respiration and a starting material for making other organic molecules.
- e) a starting material for making other organic molecules.

10) The greenhouse effect...

- a) is enhanced by the use of fossil fuels.
- b) is enhanced by increasing levels of atmospheric carbon dioxide.
- c) will increase the average temperature of the planet.
- d) is enhanced by deforestation.
- e) All of the choices are correct.

11) What is the source of energy that provides the boost for electrons during photosynthesis?

- a) electromagnetism
- b) cellular respiration
- c) ATP
- d) light
- e) None of the choices are correct.

12) CO₂ enters and O₂ escapes from a leaf via...

- a) grana.
- b) central vacuoles.
- c) thylakoids.
- d) stroma.
- e) stomata.

13) ATP and NADPH...

- a) production is associated with events taking place on the inner mitochondrial membrane.
- b) play a role in glucose synthesis by plants.
- c) are products of the Calvin cycle.
- d) are inputs to the photosystems.
- e) All of the choices are correct.

14) Chloroplasts contain disklike membranous sacs arranged in stacks called...

- a) cristae.
- b) vacuoles.
- c) grana.
- d) stroma.
- e) thylakoids.

- 15) In the chloroplast, sugars are made in a compartment that is filled with a thick fluid called the...**
- a) stroma.
 - b) stomata.
 - c) mesophyll.
 - d) thylakoid.
 - e) matrix.
- 16) What is the main advantage of the C₄ and CAM photosynthesis strategies over the C₃ strategy?**
- a) They allow the plant to fix carbon more efficiently under conditions of low atmospheric CO₂.
 - b) They help the plant conserve water and synthesize glucose efficiently under hot, dry conditions.
 - c) They allow the plant to avoid photorespiration by producing a four-carbon sugar in place of glucose.
 - d) They make it possible for the plant to use the Calvin cycle at night and during the day.
 - e) They allow the plant to fix carbon more efficiently in dim or cool conditions.
- 17) Which of these colors contributes the least energy to photosynthesis?**
- a) blue
 - b) violet
 - c) red
 - d) green
 - e) orange
- 18) Where is chlorophyll found in a plant cell?**
- a) cristae
 - b) matrix
 - c) cytoplasm
 - d) thylakoid membranes
 - e) stroma
- 19) The Calvin cycle involves all of the following except...**
- a) regeneration of NADP +.
 - b) carbon fixation.
 - c) addition of electrons and protons to carbon.
 - d) formation of waste products in the form of carbon dioxide
 - e) reduction of carbon.
- 20) The Calvin cycle constructs _____, an energy-rich molecule that a plant cell can then use to make glucose or other organic molecules.**
- a) NADPH
 - b) carbon dioxide
 - c) G3P
 - d) ATP
 - e) NADH

21) The ultimate source of all the food we eat and the oxygen we breathe is...

- a) glycolysis.
- b) anaerobic metabolism.
- c) chemiosmosis.
- d) cellular respiration.
- e) photosynthesis.

22) Which of the following are produced during the Calvin cycle? 6) _____

- a) ATP, NADPH, Oxygen
- b) glucose, ADP, NADP+
- c) ATP, NADPH, carbon dioxide
- d) glucose, ADP, NADP+, carbon dioxide

23) In photophosphorylation, energy from electron flow is used to transport _____ from the _____ to the thylakoid compartment, generating a concentration gradient of _____.

- a) electrons . . . grana . . . H^+
- b) H^+ . . . grana . . . electrons
- c) H^+ . . . stroma . . . H^+
- d) H^+ . . . stroma . . . ATP
- e) electrons . . . stroma . . . H^+

24) Plant cells...

- a) have mitochondria and chloroplasts.
- b) lack mitochondria but have chloroplasts.
- c) have mitochondria but do not have chloroplasts.
- d) lack mitochondria and chloroplasts.

25) Which of the following is not an example of a photoautotroph?

- a) fungi
- b) algae
- c) cyanobacteria in freshwater and marine ecosystems
- d) herbs like thyme and basil
- e) kelp in an underwater forest

26) As a result of the cascade of electrons down the electron transport chains of the light reactions...

- a) NADPH is oxidized to $NADP^+$.
- b) water is formed.
- c) $NADP^+$ is reduced to NADPH.
- d) $NADP^+$ is oxidized to NADPH.
- e) NADPH is reduced to $NADP^+$.

27) Do photosynthesizing plants have mitochondria?

- a) No, they use sunlight to power cellular all work.
- b) No, chloroplasts produce ATP and glucose.
- c) Yes, to supply the plant with the ATP needed to power various cell activities.
- d) Yes, to convert glucose into starch.
- e) Yes, but only in CAM plants, in which carbon is fixed at night.

28) To produce one glucose, the Calvin cycle needs to be run through _____ time(s).

- a) six
- b) one
- c) two
- d) four
- e) eight

29) The light reactions occur in the _____ while the Calvin cycle occurs in the _____.

- a) stroma . . . nucleus
- b) thylakoid membranes . . . stroma
- c) stroma . . . thylakoid membranes
- d) cytoplasm . . . stroma
- e) cytoplasm . . . thylakoid membrane

30) A small oak seedling weighing less than 6 ounces is planted in a pot that contains 150 pounds of soil. Approximately 1 pound of nitrogen and phosphorus fertilizer is added to the soil. For 2 years, the plant is given plenty of water and light. At the end of the experiment, the plant weighs nearly 25 pounds. You would expect...

- a) the soil to have gained weight, since the plant has been releasing waste products into it.
- b) the soil to weigh approximately 25 pounds less than when you started the experiment.
- c) considerable changes in soil weight.
- d) a significant loss in the amount of nitrogen and phosphorus in the soil.
- e) the soil to fade in color as a result of sunlight.

31) The greenhouse effect is...

- a) reduced by the addition of carbon dioxide to the atmosphere, since carbon dioxide removes excess heat from the Earth's surface and reflects it back into space.
- b) reduced by photosynthesis, which removes carbon dioxide from the atmosphere.
- c) made worse by photosynthesis, which adds carbon dioxide to the atmosphere.
- d) reduced by the burning of fossil fuels, which removes oxygen from the atmosphere.
- e) All of the choices are correct.

32) Why are (most) plants green?

- a) Chlorophyll a absorbs green light.
- b) Chlorophyll a reflects green light.
- c) Chlorophyll b primarily uses green light as the source of energy for photosynthesis.
- d) Green helps plants blend into their environment as a sort of camouflage.
- e) All photosynthetic pigments are colored green.

33) Ozone...

- a) is a source of oxygen for cellular respiration.
- b) levels in the atmosphere have been steadily increasing in the past century.
- c) is broken down by carbon dioxide.
- d) formation is promoted by CFCs.
- e) protects Earth from UV radiation.

34) Which of the following are produced during the light reactions of photosynthesis?

- a) glucose, ADP, NADP^+
- b) ATP, NADPH, CO_2
- c) ATP, NADPH, O_2
- d) glucose, ADP, NADP^+ , CO_2
- e) ADP, NADP^+ , O_2

35) Producers...

- a) are autotrophs.
- b) manufacture the biosphere's food supply.
- c) sustain themselves without eating.
- d) make organic food molecules from simple raw materials.
- e) All of the choices are correct.

36) The summary equation for photosynthesis is...

- a) $6 \text{CO}_2 + 6 \text{H}_2\text{O} + \text{sunlight} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2$.
- b) $\text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2 + \text{sunlight} \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$.
- c) $\text{C}_5\text{H}_{12}\text{O}_6 + 6 \text{O}_2 + \text{sunlight} \rightarrow 6 \text{CO}_2 + 6 \text{H}_2\text{O}$.
- d) the same as the equation for glycolysis written in reverse.
- e) None of the choices are correct.

Photosynthesis Test Items - Answer Section

- B
- C
- 3) B
- 4) A
- 5) B
- 6) D
- 7) B
- 8) D
- 9) D
- 10) E
- 11) D
- 12) E
- 13) B
- 14) C
- 15) A
- 16) B
- 17) D
- 18) D
- 19) D
- 20) C
- 21) E
- 22) B
- 23) C
- 24) A
- 25) A
- 26) C
- 27) C
- 28) A
- 29) B
- 30) D
- 31) B
- 32) B
- 33) E
- 34) C
- 35) E
- 36) A