

5) If photosynthesizing green algae are provided with CO_2 containing heavy oxygen (^{18}O), later analysis will show that all of the following molecules produced by the algae contain ^{18}O EXCEPT _____.

- A) glyceraldehyde 3-phosphate (G3P)
- B) glucose
- C) ribulose biphosphate (RuBP)
- D) O_2

Answer: D

Bloom's Taxonomy: Application/Analysis

Section: 10.1

6) Every ecosystem must have _____.

- A) autotrophs and heterotrophs
- B) producers and primary consumers
- C) photosynthesizers
- D) autotrophs

Answer: D

Bloom's Taxonomy: Synthesis/Evaluation

Section: 10.1

7) When oxygen is released as a result of photosynthesis, it is a direct by-product of _____.

- A) splitting water molecules
- B) chemiosmosis
- C) the electron transfer system of photosystem I
- D) the electron transfer system of photosystem II

Answer: A

Bloom's Taxonomy: Knowledge/Comprehension

Section: 10.1

8) Which of the following statements is a correct distinction between autotrophs and heterotrophs?

- A) Cellular respiration is unique to heterotrophs.
- B) Only heterotrophs have mitochondria.
- C) Autotrophs, but not heterotrophs, can nourish themselves beginning with CO_2 and other nutrients that are inorganic.
- D) Only heterotrophs require oxygen.

Answer: C

Bloom's Taxonomy: Knowledge/Comprehension

Section: 10.1

42) A flask containing photosynthetic green algae and a control flask containing water with no algae are both placed under a bank of lights, which are set to cycle between 12 hours of light and 12 hours of dark. The dissolved oxygen concentrations in both flasks are monitored. Predict what the relative dissolved oxygen concentrations will be in the flask with algae compared to the control flask. The dissolved oxygen in the flask with algae will _____.

- A) always be higher
- B) always be lower
- C) be higher in the light, but the same in the dark
- D) be higher in the light, but lower in the dark

Answer: D

Bloom's Taxonomy: Application/Analysis

Section: 10.2

43) Which of the following are products of the light reactions of photosynthesis that are utilized in the Calvin cycle?

- A) CO₂ and glucose
- B) H₂O and O₂
- C) ADP, P_i, and NADP⁺
- D) ATP and NADPH

Answer: D

Bloom's Taxonomy: Knowledge/Comprehension

Section: 10.3

44) Where does the Calvin cycle take place?

- A) stroma of the chloroplast
- B) thylakoid membrane
- C) interior of the thylakoid (thylakoid space)
- D) outer membrane of the chloroplast

Answer: A

Bloom's Taxonomy: Knowledge/Comprehension

Section: 10.3

45) What is the primary function of the Calvin cycle?

- A) use NADPH to release carbon dioxide
- B) split water and release oxygen
- C) transport RuBP out of the chloroplast
- D) synthesize simple sugars from carbon dioxide

Answer: D

Bloom's Taxonomy: Knowledge/Comprehension

Section: 10.3

48) Refer to the figure. To identify the molecule that accepts CO₂, Calvin and Benson manipulated the carbon-fixation cycle by either cutting off CO₂ or cutting off light from cultures of photosynthetic algae. They then measured the concentrations of various metabolites immediately following the manipulation. How would these experiments help identify the CO₂ acceptor?

- A) The CO₂ acceptor concentration would decrease when either the CO₂ or light are cut off.
- B) The CO₂ acceptor concentration would increase when either the CO₂ or light are cut off.
- C) The CO₂ acceptor concentration would increase when the CO₂ is cut off, but decrease when the light is cut off.
- D) The CO₂ acceptor concentration would decrease when the CO₂ is cut off, but increase when the light is cut off.

Answer: C

Bloom's Taxonomy: Synthesis/Evaluation

Section: 10.3

49) Which of the following sequences correctly represents the flow of electrons during photosynthesis?

- A) NADPH → O₂ → C O₂
- B) H₂O → NADPH → Calvin cycle
- C) NADPH → chlorophyll → Calvin cycle
- D) NADPH → electron transport chain → O₂

Answer: B

Bloom's Taxonomy: Knowledge/Comprehension

Section: 10.3

50) Which of the following does NOT occur during the Calvin cycle?

- A) oxidation of NADPH
- B) release of oxygen
- C) regeneration of the CO₂ acceptor
- D) consumption of ATP

Answer: B

Bloom's Taxonomy: Knowledge/Comprehension

Section: 10.3

51) What compound provides the reducing power for Calvin cycle reactions?

- A) ATP
- B) NADH
- C) NADP⁺
- D) NADPH

Answer: D

Bloom's Taxonomy: Knowledge/Comprehension

Section: 10.3