*Biology for a Changing World 2e,* Chapter 5 Test Bank

1. An organism that can carry out photosynthesis is

1. a heterotroph.
2. usually found on the land.
3. an autotroph.
4. a fungus.
5. always a plant.

Answer: C

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important Words/Concepts: heterotrophy/autotrophy

2. How do plants help mitigate the effects of climate change?

*Answer:* Carbon dioxide is one of the main greenhouse gases contributing to global climate change. Plants use carbon dioxide during photosynthesis, and thus remove carbon dioxide from the environment and mitigate the effects of global warming.

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Use It

Difficulty: Hard

Important Words/Concepts: autotroph, photosynthesis

3. Autotrophs are useful because

1. they remove carbon dioxide from the air.
2. they add oxygen to the air.
3. they are a source of food for humans.
4. some are a potential source of fuel.
5. All of the above,

Answer: E

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Use It

Difficulty: Easy

Important words/concepts: autotrophs, chemical energy, photosynthesis

4. An autotroph ultimately gets its energy from

1. stored food.
2. eating heterotrophs.
3. food.
4. the Sun.
5. digestion.

Answer: D

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important words/concepts: autotrophs, chemical energy, photosynthesis

5. An organism that makes its own food by photosynthesis is called

* 1. an autotroph.
	2. a heterotroph.
	3. a myotroph.
	4. a phototroph.
	5. a flurotroph.

Answer: A

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important Words/Concepts: autotroph, photosynthesis

6. All of the following are autotrophs EXCEPT

A. a giant redwood.

B. a cyanobacterium.

C. the algae living inside a lichen.

D. a kangaroo.

E. a blueberry plant.

Answer: D

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important Words/Concepts: autotroph

7. Which of the following organisms is NOT an autotroph?

1. algae
2. cyanobacteria
3. mushroom
4. corn
5. pine tree

Answer: C

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important words/concepts: autotroph, heterotroph

8. The radiant energy of the Sun is used by autotrophs to produce

1. kinetic energy for cellular functions.
2. potential energy such as oils.
3. kinetic energy to make cell components.
4. potential energy such as carbohydrates.
5. All of the above

Answer: E

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Use It

Difficulty: Easy

Important words/concepts: autotrophs, chemical energy, photosynthesis

9. Which molecules are produced by autotrophs during photosynthesis?

1. glucose and carbon dioxide
2. glucose and oxygen
3. water and carbon dioxide
4. glucose, carbon dioxide, and water
5. carbon dioxide, oxygen, and glucose

Answer: B

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important words/concepts: autotrophs, chemical energy, photosynthesis

10. The ultimate source of energy for most living organisms is

* 1. geothermal energy.
	2. sunlight.
	3. wind.
	4. algae.
	5. heat.

Answer: B

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important Words/Concepts: photosynthesis

11. What happens to the chemical energy produced by photosynthesis?

* 1. It is used to build more cells.
	2. It is used to fuel cellular processes.
	3. It is used as an immediate source of energy.
	4. It is stored.
	5. All of the above.

Answer: E

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important Words/Concepts: autotroph, photosynthesis

12. Which statement about an autotroph is NOT true?

1. produces carbohydrates and requires carbon dioxide
2. uses inorganic materials for nutrients
3. requires an input of light or chemical energy
4. makes its own food
5. is dependent on other organisms for its food

Answer: E

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important Words/Concepts: autotrophs, heterotrophs

13. What is the difference between an autotroph and a heterotroph? Give an example of each.

*Answer:* An autotroph is an organism such as a plant that obtains energy directly from the Sun and makes its own food, whereas a heterotroph such as a human must consume other organisms to obtain energy.

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important Words/Concepts: autotroph, heterotroph

14. \_\_\_\_\_\_\_\_\_\_ have chloroplasts and produce \_\_\_\_\_\_\_\_\_\_ as a waste product, whereas \_\_\_\_\_\_\_\_\_\_ ingest their food and have \_\_\_\_\_\_\_\_\_ as a waste product.

* 1. Autotrophs; glucose; heterotrophs; oxygen
	2. Autotrophs; oxygen; heterotrophs; carbon dioxide
	3. Autotrophs; oxygen; heterotrophs; glucose
	4. Heterotrophs; carbon dioxide; autotrophs; oxygen
	5. Heterotrophs; oxygen; autotrophs; carbon dioxide

Answer: B

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Know It

Difficulty: Easy

Important Words/Concepts: autotroph, heterotroph, photosynthesis

15. Could heterotrophs survive without autotrophs? Explain your answer.

*Answer:* No, heterotrophs could not survive without autotrophs because only autotrophs are able to harvest the energy of the Sun to make glucose and other energy-rich molecules. These are the molecules that are ultimately consumed by heterotrophs as their energy source. Furthermore, autotrophs produce oxygen as a waste product, and oxygen is used by heterotrophs to make ATP.

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Use It

Difficulty: Hard

Important Words/Concepts: autotroph, heterotroph

16. Define autotroph.

*Answer:* An organism that is capable of capturing sunlight or other energy to create its own energy-storage molecules.

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Use It

Difficulty: Easy

Important Words/Concepts: heterotrophs, autotrophs

17. Define heterotroph.

*Answer:* An organism that is not capable of capturing sunlight or other energy to create its own energy-storage molecules; therefore, it must obtain energy from other organisms.

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Use It

Difficulty: Easy

Important Words/Concepts: heterotrophs, autotrophs

18. List three groups of heterotrophs and three groups of autotrophs.

*Answer:* Heterotrophs—animals, fungi, bacteria; autotrophs—plants, algae, cyanobacteria.

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Use It

Difficulty: Hard

Important Words/Concepts: heterotrophs, autotrophs

19. Today you can go into a store specializing in nutrition products and buy a nutritional supplement composed of ground spirulina, a species of cyanobacterium. Ancient artwork and texts show Aztecs farming and harvesting spirulina. Of what value is cultivated spirulina?

*Answer:* Spirulina is a cyanobacterium, or a photosynthetic bacterium. As such, it can collect atmospheric CO2 and use it to make various biomolecules, including sugars and proteins, and serve as an important food source. In the right conditions, spirulina can be more productive than other forms of agriculture just like algae.

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Use It

Difficulty: Hard

Important Words/Concepts: heterotrophs, autotrophs

20. The text quotes Jim Sears saying, “Algae truly are the foundations of our entire planet.” Explain what he meant by that.

*Answer:* Much of the planet is covered with water and much of that water contains algae. Thus, a large percentage of the planet surface contains photosynthetic organisms. Photosynthetic organisms convert inorganic atmospheric CO2 to organic molecules, which then become the energy sources of all other organisms. Algae are found at the base, or foundation, of ecosystem food webs.

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Use It

Difficulty: Hard

Important Words/Concepts: algae, ecology, autotrophs, heterotrophs

21. A local developer starts a project to build a house in a natural field. He bulldozes the topsoil to the edge and digs a hole for the basement. Due to financial problems, he abandons the project leaving a 1000-square-meter patch of bare land. What effect does this land conversion have on atmospheric carbon dioxide?

1. 30 more grams of carbon dioxide will be removed from the atmosphere per year.
2. 30,000 more grams of carbon dioxide will be removed from the atmosphere per year.
3. 30 fewer grams of carbon dioxide will be removed from the atmosphere per year.
4. 30,000 fewer grams of carbon dioxide will be removed from the atmosphere per year.
5. 30,000 more grams of carbon dioxide will be released into the atmosphere per year.

Answer: D

DQ: What are the photosynthetic organisms on the planet, and why are they so important?

Type: Use It

Difficulty: Hard

Important Words/Concepts: soil photosynthesis, land use

22. All energy in the biological world ultimately originates from

1. chemical energy.
2. radiant energy.
3. potential energy.
4. kinetic energy.
5. mechanical energy.

Answer: B

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Know It

Difficulty: Easy

Important Words/Concepts: the conversion of energy from one form to another

23. A rock balanced at the top of a precipice has

1. mechanical energy.
2. radiant energy.
3. chemical energy.
4. potential energy.
5. kinetic energy.

Answer: D

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Know It

Difficulty: Easy

Important Words/Concepts: the conversion of energy from one form to another

24. Animal movement requires a conversion of energy from

1. mechanical to potential energy.
2. radiant to kinetic energy.
3. chemical to kinetic energy.
4. mechanical energy to kinetic.
5. kinetic to potential energy.

Answer: C

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Easy

Important Words/Concepts: the conversion of energy from one form to another

25. What occurs as a cyclist pedals down a hill?

1. Potential energy and kinetic energy are unchanged.
2. Potential energy goes down as kinetic energy goes down.
3. Potential energy goes up as kinetic energy goes down.
4. Potential energy goes up as kinetic energy goes up.
5. Potential energy goes down as kinetic energy goes up.

Answer: E

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Easy

Important Words/Concepts: the conversion of energy from one form to another

26. The principle that energy is neither created nor destroyed, but can change form, is referred to as the principle of

* 1. entropy.
	2. energetics.
	3. kinetics.
	4. conservation of energy.
	5. creation.

Answer: D

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Know It

Difficulty: Easy

Important Words/Concepts: energy, law of conservation of energy

27. In the list below, put a “P” next to items representing potential energy and a “K” next to items representing kinetic energy.

\_\_\_\_\_ Water behind a dam

\_\_\_\_\_ Water turning a turbine

\_\_\_\_\_ A pen sitting on top of a desk

\_\_\_\_\_ Carbon-hydrogen bonds

\_\_\_\_\_ Burning wood

\_\_\_\_\_ Pizza

*Answer:*

\_\_P\_\_ Water behind a dam

\_\_K\_\_ Water turning a turbine

\_\_P\_\_ A pen sitting on top of a desk

\_\_P\_\_ Carbon-hydrogen bonds

\_\_K\_\_ Burning wood

\_\_P\_\_ Pizza

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Easy

Important Words/Concepts: energy, kinetic energy, potential energy

28. What is the difference between potential energy and kinetic energy?

*Answer:* Potential energy is the energy associated with position or with chemical bonds, whereas kinetic energy is the energy associated with motion.

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Know It

Difficulty: Easy

Important Words/Concepts: energy, kinetic energy, potential energy

29. \_\_\_\_\_ is the ability to do work.

1. Fuel
2. Conservation
3. Energy
4. Photosynthesis
5. Motion

Answer: C

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Know It

Difficulty: Easy

Important Words/Concepts: energy

30. If your car runs out of gas, the energy that was contained in the gas has

1. been destroyed.
2. increased and changed form.
3. been converted to several other forms of energy.
4. created new energy.
5. been converted into chemical energy.

Answer: C

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Hard

Important Words/Concepts: energy

31. A rock sitting on top of a hill has \_\_\_\_\_ energy. While rolling down the hill the rock would have \_\_\_\_\_ energy.

1. potential; chemical
2. kinetic; kinetic
3. kinetic; potential
4. potential; kinetic
5. kinetic; potential

Answer: D

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Easy

Important Words/Concepts: energy

32. The energy of movement is \_\_\_\_ energy.

*Answer:* kinetic

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Easy

Important Words/Concepts: energy

33. The energy in our food is contained within the

* 1. chemical bonds of biological molecules.
	2. carbon atoms of molecules.
	3. nucleus of carbon atoms.
	4. fat molecules.
	5. food’s ATP molecules.

Answer: A

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Know It

Difficulty: Easy

Important Words/Concepts: potential energy

34. The energy of the oils made by algae is \_\_\_\_ energy.

*Answer:* chemical or potential

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Easy

Important Words/Concepts: energy

35. When the oils produced by algae are burned, the energy of the algae becomes \_\_\_\_\_ energy.

*Answer:* heat or kinetic

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Easy

Important Words/Concepts: energy

36. The less efficient an organism is in the conversion of energy from chemical to kinetic forms to do work, the more it will produce

1. heat in the form kinetic energy.
2. heat in the form of mechanical energy.
3. heat in the form of radiant energy.
4. heat in the form chemical energy.
5. heat in the form potential energy.

Answer: A

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Easy

Important Words/Concepts: the loss of energy on transfer

37. Which car would have the most efficient engine in terms of energy conversion?

1. a luxury truck with 20 mpg
2. a sports vehicle with 25 mpg
3. an SUV with 28 mpg
4. a compact with 30 mpg
5. a bus with 32 mpg

Answer: E

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Easy

Important Words/Concepts: the loss of energy on transfer

38. In a comparison of two different light bulbs, how could you infer which one was more efficient in terms of energy conversion?

1. compare lumens
2. compare cost
3. compare bulb temperature
4. compare bulb wattage
5. compare longevity of each bulb

Answer: C

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Hard

Important Words/Concepts: the loss of energy on transfer

39. Our cars harvest the energy stored in gasoline. If we calculate the total amount of energy in the gasoline and then calculate the total amount of energy contained in the moving parts of the engine and wheels, we find that there is much less energy in the moving car than was available in the gasoline. Knowing that energy is neither created nor destroyed, what do you think happened to the extra energy in the gasoline?

*Answer:* The extra energy from the gasoline was lost as heat and waste products.

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Hard

Important Words/Concepts: energy, heat, law of conservation of energy

40. “Heat” is best described as

* 1. kinetic energy associated with the formation of chemical bonds.
	2. potential energy associated with the breaking of chemical bonds.
	3. kinetic energy associated with chemical bonds.
	4. potential energy associated with random particle motion.
	5. kinetic energy associated with random particle motion.

Answer: E

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Know It

Difficulty: Easy

Important Words/Concepts: energy, heat, law of conservation of energy

41. Generally energy lost when transferring from one form to another is lost as

1. CO2.
2. O2.
3. glucose.
4. electricity.
5. heat.

Answer: E

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Know It

Difficulty: Easy

Important Words/Concepts: energy

42. Energy cannot be

1. harvested or transferred, but it can be created.
2. created or destroyed, but it can be transformed.
3. transformed or destroyed, but it can be transferred.
4. transferred or avoided, but it can be harvested.
5. transformed or created, but it can be destroyed.

Answer: B

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Know It

Difficulty: Hard

Important Words/Concepts: energy

43. Energy lost from a biological organism is usually lost as \_\_\_\_\_\_\_.

*Answer:* heat

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Easy

Important Words/Concepts: energy

44. Energy cannot be \_\_\_\_\_ or \_\_\_\_\_, but it can be \_\_\_\_\_\_\_\_.

*Answer:* created; destroyed; transformed

DQ: What are the different types of energy, and what transformations of energy do organisms carry out?

Type: Use It

Difficulty: Hard

Important Words/Concepts: energy

45. Algae capture light energy using which process?

1. the electron-transport chain
2. photosynthesis
3. cellular respiration
4. fermentation
5. anaerobic respiration

Answer: B

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important words/concepts: biofuel from algae

46. In addition to sunlight and carbon dioxide, algae growth requires

1. oxygen, water, and nutrients.
2. potassium and phosphates.
3. water and nutrients.
4. nitrogen and oxygen.
5. oxygen and water.

Answer: C

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important words/concepts: biofuel from algae

47. To grow algae, all of the following are needed EXCEPT

* 1. water.
	2. sunlight.
	3. oxygen.
	4. carbon dioxide.
	5. nutrients.

Answer: C

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: algae, biofuel

48. The process by which algae make the biomolecules they use for energy storage is

1. cellular respiration.
2. photosynthesis.
3. unique to algae.
4. also found in some animals.
5. dependent on oxygen.

Answer: B

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: photosynthesis

49. What are the main types of biomolecules that algae build with the energy they capture form the Sun?

*Answer:* They are the main biomolecules (organic molecules) found in all living organisms—carbohydrates, proteins, nucleic acids, and lipids.

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Use It

Difficulty: Hard

Important Words/Concepts: biomolecules

50. The most common end-product of photosynthesis is

1. glucose.
2. ethanol.
3. lactic acid.
4. biofuels.
5. ethylene.

Answer: A

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: photosynthesis

51. What molecules are produced by autotrophs?

1. C6H12O6 and H2O
2. O2 and CO
3. C6H12O6, H2O, and O2
4. H2O and O2
5. C6H12O6 and O2

Answer: E

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: the inputs and outputs of photosynthesis

52. Photosynthesis would not occur in the absence of

1. oxygen and water.
2. light, carbon dioxide, and water.
3. carbon dioxide, oxygen, and water.
4. carbon dioxide and oxygen.
5. light, carbon dioxide, oxygen, and water.

Answer: B

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: the inputs and outputs of photosynthesis

53. What is the carbon source used in photosynthesis?

1. organic carbon
2. carbon monoxide
3. carbon dioxide
4. glucose
5. ribose

Answer: C

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: the inputs and outputs of photosynthesis

54. What is the carbon source used in photosynthesis?

1. 14C
2. 6C
3. CO
4. CO2
5. C6H12O6

Answer: D

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: the inputs and outputs of photosynthesis

55. What is the simplified equation for photosynthesis?

*Answer:* Sunlight + Water + Carbon dioxide = Oxygen + Glucose

OR: light energy + H2O + CO2 = O2 + C6H12O6

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: photosynthesis

56. The organelle responsible for carrying out photosynthesis is the \_\_\_\_\_\_\_\_\_\_.

*Answer:* chloroplast

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: photosynthesis

57. The first stage of photosynthesis converts sunlight energy into

A. kinetic energy.

B. glucose.

C. chemical energy.

D. heat.

E. water.

Answer: C

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: photosynthesis

58. What are the inputs and outputs for the process of photosynthesis?

*Answer:* Inputs—water, CO2, and light energy; outputs—O2 and glucose.

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Use It

Difficulty: Easy

Important Words/Concepts: photosynthesis

59. Chlorophyll absorbs what color(s) of light?

1. red and blue
2. green and blue
3. green, red and blue
4. all visible colors
5. green only

Answer: A

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: the Sun and its spectrum

60. Chlorophyll reflects what color(s) of light?

1. red
2. green
3. blue
4. all visible colors
5. red and blue

Answer: B

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: the Sun and its spectrum

61. A particle of light energy is called a:

1. lumen.
2. spectrum.
3. photon.
4. wavelength.
5. nanometer.

Answer: C

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: the Sun and its spectrum

62. Sunlight consists of

1. the visible light spectrum.
2. long wavelength and short-energy spectrums.
3. short wavelength and high-energy spectrum.
4. the entire electromagnetic spectrum.
5. all spectrums except x-rays.

Answer: D

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: the Sun and its spectrum

63. Chlorophyll pigments absorb \_\_\_\_\_\_\_\_\_\_, which in turn excite \_\_\_\_\_\_\_\_\_, which then are used in reactions to generate \_\_\_\_\_\_\_\_\_\_.

1. photons; electrons; ATP
2. protons; electrons; ATP
3. photons; electrons; protein
4. protons; photons; ATP
5. electrons; photons; protein

Answer: A

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: glucose, photosynthesis, sunlight

64. The conversion of inorganic carbon to organic carbon is called

* 1. carbon conversion.
	2. carbon sequestration.
	3. carbon fixation.
	4. carbon exchange.
	5. carbon bonding.

Answer: C

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: glucose, photosynthesis, sunlight

65. Which of the following equations describes photosynthesis?

* 1. sunlight + O2 → CO2 + H2O + glucose
	2. sunlight + glucose + CO2 → O2 + H2O
	3. sunlight + CO2 → O2 + H2O + glucose
	4. sunlight + H2O + CO2 → O2 + glucose
	5. sunlight + H2O + O2 → CO2 + glucose

Answer: D

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: glucose, photosynthesis, sunlight

66. The O2 released during photosynthesis comes from splitting

1. glucose.
2. H2O2.
3. water.
4. CO2.
5. ATP.

Answer: C

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: photosynthesis

67. In plants, light energy is collected by which organelles?

1. Golgi apparatus
2. mitochondria
3. endoplasmic reticulum
4. chloroplasts
5. vacuoles

Answer: D

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: photosynthesis

68. The main energy currency of the cell (the molecule used to fuel the cell) is

1. ATP.
2. cyclic AMP.
3. GNP.
4. ADP.
5. DNA.

Answer: A

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: energy

69. What is carbon fixation?

*Answer:* The conversion of atmospheric inorganic carbon dioxide into an organic molecule.

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Use It

Difficulty: Hard

Important Words/Concepts: carbon fixation

70. Which of the following is a correct pairing of two properties of light?

1. long wavelength—high energy
2. visible light—400 to 750 nm wavelength
3. low energy—short wavelength
4. light used for photosynthesis—reflected color
5. green light—absorbed by chlorophyll

Answer: B

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: properties of light, photosynthesis

71. Which of the following puts the wavelengths of light in order from shortest to longest?

1. green→violet→yellow→red
2. yellow→green→red→violet
3. violet→green→yellow→red
4. red→yellow→green→violet
5. violet→red→yellow→green

Answer: C

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: photon, sunlight, wavelength

72. Which of the following puts the wavelengths of the electromagnetic spectrum in order from shortest to longest?

A. ultraviolet light→x-rays→ visible light→radio waves→microwaves

B. x-rays→ultraviolet light→visible light→microwaves→radio waves

C. microwaves→ radio waves→visible light→ x-rays→ultraviolet light

D. radio waves→visible light→ microwaves→x-rays→ultraviolet light

E. radio waves→microwaves→visible light→ultraviolet light→x-rays

Answer: B

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: photon, sunlight, wavelength

73. Visible light has wavelengths in the range of

1. 100–450 nm.
2. 300–675 nm.
3. 375–920 nm.
4. 400–750 nm.
5. 600–900 nm.

Answer: D

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: photon, sunlight, wavelength

74. Why do we perceive a red rose to be red?

 *Answer:* The rose appears to be red because it absorbs wavelengths of all colors except red. Red wavelengths are reflected back to us, and so our eye perceives the color red.

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Use It

Difficulty: Hard

Important Words/Concepts: photon, sunlight, wavelength

75. Longer wavelengths of light, such as \_\_\_\_\_\_\_, have \_\_\_\_\_\_\_\_ energy than shorter wavelengths, such as \_\_\_\_\_\_\_\_\_.

1. red; less; violet
2. yellow; more; blue
3. blue; less; red
4. blue; more; violet
5. orange; more; blue

Answer: A

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: photon, sunlight, wavelength

76. What are the colors of the visible light spectrum?

 *Answer*: ROYGBIV = Red, Orange, Yellow, Green, Blue, Indigo, Violet.

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Use It

Difficulty: Hard

Important Words/Concepts: light

77. Which of the following colors is least useful in photosynthesis?

A. blue

B. green

C. red

D. yellow

E. orange

Answer: B

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Use It

Difficulty: Easy

Important Words/Concepts: light

78. The color of an object we see is the color that it

A. absorbs.

B. is attracted to.

C. collects.

D. reflects.

E. uses.

Answer: D

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Easy

Important Words/Concepts: light

79. What colors of light are most effective for photosynthesis?

 *Answer*: red and blue

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: light

80. Which of these colors of light has the shortest wavelength?

A. blue

B. green

C. red

D. yellow

E. orange

Answer: A

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: light

81. Which of these colors of light has the longest wavelength?

A. blue

B. green

C. red

D. yellow

E. orange

Answer: C

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: light

82. What color of light is least useful in photosynthesis?

 *Answer*: green

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: light

83. Which of these forms of radiation has the most energy?

A. blue light

B. gamma rays

C. UV radiation

D. radio waves

E. infrared radiation

Answer: B

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: light

84. Which of these forms of radiation has the least energy?

A. blue light

B. gamma rays

C. UV radiation

D. radio waves

E. infrared radiation

Answer: D

DQ: How do plants and algae convert the energy in sunlight into energy-rich organic molecules? (And why can’t humans do this?)

Type: Know It

Difficulty: Hard

Important Words/Concepts: light

85. Approximately how much of the energy demand in the United States is met by the consumption of fossil fuel?

1. 90%
2. 80%
3. 70%
4. 60%
5. 50%

Answer: B

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: U.S. fossil fuel consumption

86. The loss of which energy source would affect the United States the most, given its current energy usage?

1. renewable sources
2. coal
3. petroleum
4. natural gas
5. nuclear power

Answer: C

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: U.S. fossil fuel consumption

87. Which of these energy sources is considered non-renewable?

1. hydroelectric
2. geothermal
3. biomass
4. natural gas
5. wind energy

Answer: D

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: U.S. fossil fuel consumption

88. Which energy source does the United States rely on least for its energy production?

1. renewable sources
2. coal
3. petroleum
4. natural gas
5. nuclear power

Answer: A

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: U.S. fossil fuel consumption

89. Which is the correct order from most to least of U.S energy consumption by source?

1. petroleum, natural gas, coal, renewable energy, and nuclear power
2. petroleum, natural gas, nuclear power, coal, and renewable energy
3. coal, petroleum, natural gas, nuclear power, and renewable energy
4. petroleum, coal, natural gas, nuclear power, and renewable energy
5. petroleum, natural gas, coal, nuclear power, and renewable energy

Answer: E

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: U.S. fossil fuel consumption

90. Which of the following places the sources of energy used by the United States in order from most used to least used?

* 1. coal→nuclear→hydroelectric→petroleum
	2. coal→petroleum→hydroelectric→nuclear
	3. petroleum→coal→nuclear→hydroelectric
	4. petroleum→coal→ hydroelectric→ nuclear
	5. nuclear→petroleum→hydroelectric→coal

Answer: C

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: energy

91. All of the following are sources of renewable energy EXCEPT

* 1. hydroelectric.
	2. biomass.
	3. solar.
	4. coal.
	5. geothermal.

Answer: D

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: energy, renewable

92. Currently in the United States, the most commonly used renewable energy source is

* 1. hydroelectric.
	2. biomass.
	3. solar.
	4. wind.
	5. geothermal.

Answer: A

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: energy, renewable

93. All of the following statements about energy sources are true EXCEPT

* 1. the United States exports oil to the rest of the world.
	2. Saudi Arabia has the largest petroleum oil reserves in the world.
	3. approximately 40% of energy consumed in the United States comes from petroleum products.
	4. less than 10% of energy consumed in the United States is considered renewable.
	5. the United States is investing money to develop algae as a source of biodiesel oil.

Answer: A

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: energy

94. Is corn a good source for biofuels? Give at least two reasons why or why not.

*Answer:* No, corn is not a good source for biofuels because using corn for biofuel reduces the food supply, and growing corn requires a lot of water, fertilizer, and pesticides. Furthermore, converting corn to ethanol is an energy-intensive process that produces large amounts of greenhouse gases.

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Hard

Important Words/Concepts: biofuel, energy, ethanol

95. What is the most-used fuel source in the United States?

*Answer:* petroleum

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: fuel

96. What is a fossil fuel? What forms of fossil fuel are commonly used in the United States?

*Answer:* Fossil fuels are formed from the fossilized remains of plants that died millions of years ago. The three types commonly used in the United States are coal, natural gas, and petroleum products.

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Use It

Difficulty: Hard

Important Words/Concepts: fossil fuels

97. Why are fossil fuels considered non-renewable energy?

*Answer:* Although the geologic processes that make fossil fuels are still occurring on the planet, these processes take millions of years. We are using fossil fuels at a rate that greatly (drastically) exceeds their replenishment rate.

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Use It

Difficulty: Hard

Important Words/Concepts: fossil fuels

98. Why are biofuels considered renewable energy?

*Answer:* More biofuels can be grown to replace what has been used. We could, in the future, replenish biofuels at a rate close to the consumption rate.

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Use It

Difficulty: Hard

Important Words/Concepts: fossil fuels

99. Which of these products can be produced from algae grown in a bioreactor?

1. organic fertilizer from algal carcasses
2. oil for fuel
3. carbohydrates for ethanol production
4. proteins for animal feed
5. All of the above.

Answer: E

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important words/concepts: biofuel from algae

100. List at least three advantages of making biofuel from algae compared to making biofuel from corn.

*Answer:*

* + More fuel can be produced per acre from algae.
	+ Algae can be grown on land not suitable for crops, thus eliminating competition for precious land resources.
	+ Algae make fuel directly and more efficiently than corn because making ethanol from corn requires many steps that consume time, energy, and money.
	+ Algae use less water, pesticide, and fertilizer than corn.

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: algae, biofuel, ethanol

101. List at least three products produced by algae and how they are used.

*Answer:*

* + oil for biodiesel fuel
	+ carbohydrates for ethanol and electricity
	+ proteins for animal feed
	+ algae biomass (carcass) for electricity, heat, and fertilizer

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Hard

Important Words/Concepts: algae, biofuel

102. All of the following photosynthetic organisms are currently being researched as sources of biofuels EXCEPT

* 1. soy beans.
	2. corn.
	3. rapeseed (canola).
	4. algae.
	5. peanuts.

Answer: E

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

Important Words/Concepts: algae, plants, biofuel

103. What is biomass?

*Answer:* Biomass is the bodies of living organisms that can be burned as a fuel source.

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Use It

Difficulty: Easy

Important Words/Concepts: fuel

104. All of the following are true of biofuel produced from algae EXCEPT

* 1. when burned, they release about the same amount of carbon dioxide that they took in for photosynthesis.
	2. when burned, they release fewer pollutants than traditional fuels.
	3. to produce enough algae-based biofuel to meet human needs, algae need more carbon dioxide than is available in the atmosphere.
	4. algae-based biofuel requires more nutrients than corn-based biofuel.
	5. in addition to biofuel, algae make other products that can be used to generate electricity.

Answer: D

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Hard

Important Words/Concepts: autotroph, photosynthesis

105. Algae are being grown for biofuels in places like Hawaii and California because

A. labor is available and cheap.

B. there is almost constant daytime sunlight.

C. prime agricultural land is available for ponds.

D. the water is high in nutrients.

E. there are more government incentives to locate there than in other states.

Answer: B

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy

106. Algae make oil in order to

A. adhere to other cells.

B. store chemical energy.

C. control buoyancy.

D. store energy from sugars made during photosynthesis.

E. All of the above.

Answer: E

DQ: How do algal biofuels compare to other fuels in terms of costs, benefits, and sustainability?

Type: Know It

Difficulty: Easy