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

1. The periodic table is a chart describing
    A. the known elements ordered by their atomic number.
    B. the number of electrons of each element.
    C. the size of an element.
    D. the elements that are found in living organisms.
    E. the abundance of each element on Earth.

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: the periodic table of elements, atoms and subatomic particles

2. Each element is made up of a unique type of
    A. atom.
    B. protein.
    C. neutron.
    D. proton and neutron.
    E. macromolecule.

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: the periodic table of elements, atoms and subatomic particles

3. Atoms are made up of
    A. positively charged protons, negatively charged neutrons, and neutral electrons.
    B. positively charged electrons, negatively charged neutrons, and neutral protons.
    C. positively charged protons, negatively charged electrons, and neutral neutrons.
    D. negatively charged protons, positively charged electrons, and neutral neutrons.
    E. positively charged neutrons, negatively charged electrons, and neutral neutrons.

Answer: C
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: the periodic table of elements, atoms and subatomic particles

4. Elements are ordered in the periodic table by their
    A. atomic weight or electron and neutron number.
    B. atomic mass or electron and proton number.
    C. atomic number or electron number.
    D. atomic number or proton number.
    E. atomic number or proton and neutron number.

Answer: D
DQ: How is matter organized into molecules of living organisms?

Type: Know It
Difficulty: Hard
Important Words/Concepts: the periodic table of elements, atoms and subatomic particles

5. In order for an element to have no charge, which must be equivalent in number?
    A. subatomic particles and electrons
    B. subatomic particles and protons
    C. electrons and neutrons
    D. neutrons and protons
    E. protons and electrons

Answer: E
DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important Words/Concepts: the periodic table of elements, atoms and subatomic particles

6. The smallest unit of an element that still retains the property of an element is
    A. a proton.
    B. a neutron.
    C. an electron.
    D. an atom.
    E. a molecule.

Answer: D
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: element

7. Which of the following statements is TRUE?
    A. Protons, neutrons, and electrons are found inside the nucleus of an atom.
    B. Protons and electrons are found in the nucleus and neutrons orbit around them.
    C. Protons and neutrons are found in the nucleus and electrons orbit around them.
    D. Electrons are relatively heavy compared to protons and neutrons.
    E. Protons are positively charged while electrons are neutral.

Answer: C
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: electron, element, neutron, proton

8. An element’s identity is defined by its
    A. protons.
    B. neutrons.
    C. electrons.
    D. protons and neutrons.
    E. protons and electrons.

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: atomic number, electron, element, neutron, proton

9. The _____ is the smallest unit of matter that exhibits the characteristics of an element and cannot be chemically divided into a smaller unit.
    A. atom
    B. electron
    C. proton
    D. nucleus
    E. neutron

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: atomic structure

10. An element's atomic number refers to its number of
    A. protons.
    B. neutrons.
    C. electrons.
    D. protons and neutrons.
    E. protons and electrons.

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: atomic number, electron, element, neutron, proton

11. The atomic mass is equal to
    A. the number of protons.
    B. the number of neutrons.
    C. the number of electrons.
    D. the number of protons plus the number of neutrons.
    E. the number of protons plus the number of electrons.

Answer: D
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: electron, element, mass, neutron, proton

12. The number of protons plus the number of neutrons equals
    A. the atomic number.
    B. the atomic mass.

C. the number of electrons.
D. the number of bonds the atom can form.
E. the electrical charge of the atom.

Answer: B
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: electron, element, mass, neutron, proton

13. What is the atomic mass of lithium (atomic number = 3)?
    A. 1
    B. 3
    C. 4
    D. 6
    E. 9

Answer: D
DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important Words/Concepts: electron, element, mass, neutron, proton

14. What is the atomic mass of calcium (atomic number = 20)?

    Answer: 40

DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important Words/Concepts: electron, element, mass, neutron, proton

15. An isotope is the form of an element that has more or fewer neutrons than its most common form. Given this, what is the atomic number of an isotope with one extra neutron, if its atomic mass is 15?
    A. 7
    B. 8
    C. 14
    D. 16
    E. 30

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: electron, element, isotope, mass, neutron, proton

16. The atomic particles responsible for forming bonds with other atoms are
    a. protons.

b. neutrons.
c. electrons.
d. protons and neutrons.
e. protons and electrons.

Answer: C
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: bond, electron

17. Which of the following statements about neutrons is CORRECT?
    A. An atom has the same number of neutrons and electrons.
    B. Most neutrons are found in the last two shells of the atom.
    C. All neutrons are found in the valence shell of the atom.
    D. One-half of neutrons are positive and one-half are negative, giving them an overall neutral charge.
    E. All neutrons are found in the nucleus of the atom.

Answer: E
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: atomic structure

18. Potassium (K) has an atomic number of 19 and it has 20 neutrons. What is its atomic mass?
    A. 19
    B. 20
    C. 38
    D. 39
    E. 40

Answer: D
DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important Words/Concepts: atomic structure

19. The nucleus of an atom contains atomic particles called _____ and _____.

    Answer: protons; neutrons

DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: atomic structure

20. The six most abundant elements in the human body are

Answer: carbon, hydrogen, oxygen, nitrogen, calcium, and phosphorus.

DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: chemical composition

21. The four elements that make up most of your body are

Answer: carbon, hydrogen, oxygen, and nitrogen.

DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important Words/Concepts: chemical composition

22. The six most abundant elements in the human body, listed from most common to least common (highest percentage to lowest percentage), are

Answer: oxygen, carbon, hydrogen, nitrogen, calcium, and phosphorus.

DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: chemical composition

23. How many electrons does carbon (atomic number = 6) contain in its outer valence shell?
    A. 1
    B. 2
    C. 3
    D. 4
    E. 6

Answer: D
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important words/concepts: Carbon is essential to life.

24. How many electrons does carbon (atomic number = 6) contain in its first and second valence shells?
    A. 1; 5
    B. 2; 4
    C. 3; 3
    D. 4; 2
    E. 5; 1

Answer: B

DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important words/concepts: Carbon is essential to life.

25. What is the maximum number of atoms to which a single carbon can bind?
    A. 1
    B. 2
    C. 3
    D. 4
    E. 6

Answer: D
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important words/concepts: Carbon is essential to life.

26. A covalent bond is formed by
    A. the donation of an electron from one atom to another.
    B. the acceptance of an electron from one atom to another.
    C. both donation and acceptance of an electron between atoms.
    D. the sharing of electrons between atoms.
    E. a weak interaction between two atom's electrons.

Answer: D
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important words/concepts: Carbon is essential to life.

27. Which of the following is considered an inorganic molecule?
    A. carbon dioxide
    B. glucose
    C. protein
    D. sugar
    E. a hydrocarbon skeleton

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important words/concepts: Carbon is essential to life.

28. An organic molecule must have
    A. carbon.
    B. a hydrogen-carbon bond.
    C. hydrogen.
    D. covalent bonds.

E. ionic bonds.

Answer: B
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important words/concepts: Carbon is essential to life.

29. In addition to carbon, hydrogen, oxygen, and nitrogen, which elements make up the bulk of the human body?
    A. water, phosphorus, and calcium
    B. phosphorus and calcium
    C. potassium and sodium
    D. phosphate and sodium
    E. water, potassium, and sodium

Answer: B
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important words/concepts: the elements of life

30. Which of the following lists the most abundant elements in the human body from most abundant to least abundant?
    A. Oxygen→hydrogen→nitrogen→carbon
    B. Oxygen→carbon→hydrogen→nitrogen
    C. Hydrogen→oxygen→carbon→nitrogen
    D. Hydrogen→carbon→oxygen→nitrogen
    E. Nitrogen→carbon→oxygen→hydrogen

Answer: B
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: carbon, hydrogen, nitrogen, oxygen

31. A covalent bond can best be described as
    A. two atoms sharing electrons.
    B. two atoms sharing protons.
    C. one atom losing an electron to another, then sticking to it due to the attraction between opposite charges.
    D. one atom losing a proton to another, then sticking to it due to the attraction between opposite charges.
    E. a bond between atoms of two different elements.

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: covalent bond

32. Why is CO_2 classified as an inorganic molecule and not as an organic molecule?

Answer: because it does not have a carbon-carbon backbone and a carbon-hydrogen bond

DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: carbon, organic

33. Organic molecules are defined as having
    A. a carbon backbone.
    B. at least one carbon-oxygen bond.
    C. at least one carbon-hydrogen bond.
    D. A and B, but not C.
    E. A and C, but not B.

Answer: E
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: carbon, organic

34. Organic molecules contain at least
    A. three carbon to hydrogen bonds.
    B. one carbon to oxygen bond.
    C. one ionic bond.
    D. one carbon to hydrogen bond.
    E. one hydrogen to oxygen bond.

Answer: D
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: organic molecules

35. Carbon has _____ potential bonding sites.
    A. 1
    B. 2
    C. 4
    D. 8
    E. 3

Answer: C
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: carbon, organic molecules

36. A bond formed by atoms sharing electrons is known as
    A. an ionic bond.
    B. an electric bond.
    C. a covalent bond.
    D. a shared bond.
    E. a hydrogen bond.

Answer: C
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: organic molecules

37. What are the four categories of organic macromolecules found in living organisms?

Answer: carbohydrates, lipids, proteins, and nucleic acids

DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: organic molecules

38. Distinguish between organic and inorganic molecules.

    Answer: An organic molecule has a carbon backbone and at least one carbon to hydrogen bond. An inorganic molecule may have one of these, but not both.

DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important Words/Concepts: organic molecules

39. What structural motif is shared among complex carbohydrates, DNA, and proteins?

    Answer: All are organic molecules made of polymers. Complex carbohydrates are polymers of monosaccharides, DNA is a polymer of individual nucleic acids, and proteins are polymers of individual amino acids.

DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: organic molecules

40. _____ provide(s) a way to store large amounts of energy and provide thermal insulation and padding in animals.
    A. Sterols
    B. Phospholipids
    C. Fats

D. Water
E. Proteins

Answer: C
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: macromolecules

41. DNA, deoxyribonucleic acid, has a “backbone” of sugars and
A. phosphate groups.
B. starch.
C. acids.
D. glycogen.
E. glycerol.

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: macromolecules

42. There are _____ different amino acids.
A. 12
B. 73
C. 21
D. 5
E. 20

Answer: E
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: macromolecules

43. Sterols are
A. lipids.
B. carbohydrates.
C. proteins.
D. nucleic acids.
E. important solvents.

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: macromolecules

44. Match up macromolecules with their structural units.

A. Carbohydrates	a. Nucleotides

B. Proteins b. Hydrophobic molecules
C. Lipids c. Amino acids
D. Nucleic Acids d. Monosaccharides

Answer: A. d; B. c; C. b; D. a

DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important words/concepts: the molecules of life

45. Match up each category of macromolecule with the correct example.
A. Carbohydrates a. Cholesterol or fat
B. Proteins b. DNA or RNA
C. Lipids c. Hemoglobin or enzyme
D. Nucleic Acids d. Glycogen or starch

Answer: A. d; B. c; C. a; D. b

DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important words/concepts: the molecules of life

46. Match up each macromolecule with the correct example of its function.
A. Carbohydrates a. Genetic material
B. Proteins b. Speed up chemical reactions
C. Lipids c. Insulation
D. Nucleic Acids d. Energy storage

Answer: A. d; B. b; C. c; D. a

DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important words/concepts: the molecules of life

47. Which of the following macromolecules are insoluble in water?
A. carbohydrates
B. proteins
C. lipids
D. nucleic acids
E. amino acids

Answer: C
DQ: How is matter organized into molecules of living organisms?
Type: Use It

Difficulty: Easy
Important words/concepts: the molecules of life

48. Nucleotides are composed of
    A. sugar, phosphate group, and a base.
    B. sugar, amino acid, and a base.
    C. lipid, phosphate group, and base.
    D. ribose, phosphate group, and an amino acid.
    E. deoxyribose, lipid, and a base.

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important words/concepts: the molecules of life

49. What are the four types of large complex organic molecules that are found in living organisms?

Answer: Carbohydrates, proteins, lipids, and nucleic acids

DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: carbohydrate, lipid, nucleic acid, protein

50. The monomers of proteins are
    A. nucleic acids.
    B. amino acids.
    C. nucleotides.
    D. lipids.
    E. monosaccharides.

Answer: B
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: amino acid, protein

51. Label each of the following as either a monomer (M) or a polymer (P).
    __M___ Monosaccharide
    ___P__ Protein
    __P___ Lipid
    __M___ Amino acid
    __P___ Nucleic acid
    ___P__ Carbohydrate

DQ: How is matter organized into molecules of living organisms?

Type: Know It
Difficulty: Hard
Important Words/Concepts: monomer, polymer

52. An example of a nucleic acid is
    A. DNA.
    B. protein.
    C. glucose.
    D. fat.
    E. sugar.

Answer: A
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: nucleic acid

53. Which of the following are energy-storing polymers?
    A. proteins
    B. carbohydrates
    C. lipids
    D. proteins and lipids
    E. carbohydrates and lipids

Answer: E
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: carbohydrate, lipid

54. When you eat more food than your body requires, you will store the extra energy as
    A. proteins.
    B. carbohydrates.
    C. lipids.
    D. proteins and lipids.
    E. carbohydrates and lipids.

Answer: E
DQ: How is matter organized into molecules of living organisms?
Type: Use It
Difficulty: Easy
Important Words/Concepts: carbohydrate, lipid

55. Lipids may function in all of the following ways EXCEPT
    A. hormones.
    B. energy storage.
    C. components of cell membranes.
    D. structural support.
    E. insulation.

Answer: D
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: lipid

56. All of the following are true of proteins EXCEPT
    A. they help speed up chemical reactions.
    B. their function is dependent on their shape.
    C. they serve as energy-storage molecules.
    D. they help move things around inside of cells.
    E. they contain peptide bonds.

Answer: C
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: protein

57. DNA differs from RNA because
    A. RNA is not made up of nucleotides, but DNA is.
    B. RNA is a nucleotide, whereas DNA is a nucleic acid.
    C. RNA does not contain a sugar molecule, but DNA does.
    D. RNA is only one linear chain, whereas DNA consists of two chains bonded together.
    E. RNA has an attached lipid, but DNA does not.

Answer: D
DQ: How is matter organized into molecules of living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: DNA, nucleic acid, RNA

58. Which of the following is NOT a functional trait of a living organism?
    A. growing and reproducing
    B. moving from place to place
    C. responding to their environment
    D. obtaining and using energy
    E. maintaining a stable internal environment

Answer: B
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Easy
Important Words/Concepts: characteristics of living things

59. When a plant bends toward sunlight, the bending is an example of which characteristic of life?
    A. growth
    B. reproduction
    C. responding to their environment
    D. obtaining and using energy
    E. maintaining a stable internal environment

Answer: C
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Easy
Important Words/Concepts: characteristics of living things

60. The ability of living organisms to maintain a stable internal environment is termed
    A. feedback inhibition.
    B. anabolism.
    C. catabolism.
    D. homeostasis.
    E. metabolism.

Answer: D
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Easy
Important Words/Concepts: characteristics of living things

61. Which functional trait does a mule NOT share with all living organisms?
    A. growth
    B. reproduction
    C. responding to their environment
    D. obtaining and using energy
    E. maintaining a stable internal environment

Answer: B
DQ: What is the definition of life, and how could Martian life be recognized?

Type: Use It
Difficulty: Easy
Important Words/Concepts: characteristics of living things

62. Which of the following do NOT share all of the functional traits of a living organism?
    A. bacteria
    B. mushrooms
    C. plants
    D. dogs
    E. viruses

Answer: E
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Use It
Difficulty: Medium
Important Words/Concepts: characteristics of living things

63. Name the five functional traits of all living organisms.

Answer:
A. Growth
B. Reproduction
C. Homeostasis/maintaining a stable internal environment
D. Responding to the environment
E. Obtaining and using energy

DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Hard
Important Words/Concepts: energy, growth, homeostasis, reproduction, sense

64. Whether or not viruses are alive is frequently debated. Name one characteristic of viruses that makes them similar to other living organisms and one characteristic that challenges our understanding of life.

    Answer: Viruses seem alive because they can reproduce themselves; however, they are not made of cells.

DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Hard
Important Words/Concepts: virus

65. Which of these is NOT a necessary characteristic of life?
    A. ability to grow
    B. ability to move around in the environment
    C. ability to reproduce

D. ability to respond to stimuli
E. ability to use energy

Answer: B
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Easy
Important Words/Concepts: characteristics of life

66. Maintaining a separate and distinct internal environment from the external environment is called
A. life.
B. cell exclusion.
C. metabolism.
D. hydrophobicity.
E. homeostasis.

Answer: E
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Easy
Important Words/Concepts: characteristics of life

67. Viruses contain genetic material. They can make copies of themselves, but only by using the services of a living host cell. Viruses are assembled in their final form and size by the host cell. Viruses use the host cell's energy mechanisms; they lack any of their own. Is a virus alive? Support your answer.

Answer: No, a virus is not alive. A living cell must be able to accomplish all of the above-stated tasks by itself, but a virus must use another cell to make copies of itself. It uses the other cell's metabolism, and it does not grow and develop on its own. Instead, it is assembled in its final form. Just because they contain genetic material does not make them alive.

DQ: What is the definition of life, and how could Martian life be recognized?
Type: Use It
Difficulty: Hard
Important Words/Concepts: characteristics of life

68. If life exists on Mars, what form is it likely to be?
A. microscopic
B. silicon-based
C. large and mobile
D. the same as on Earth
E. intelligent

Answer: A
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Use It

Difficulty: Easy
Important Words/Concepts: Mars exploration

69. The NASA rover *Curiosity* is looking for signs of life on Mars by analyzing soil for what substance?

A. inorganic molecules
B. organic molecules
C. carbon dioxide
D. water
E. oxygen

Answer: B
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Easy
Important Words/Concepts: Mars exploration

70. Scientists have strong evidence that water on Mars

A. is in liquid form.
B. forms a cloud of vapor.
C. is absent in frozen form.
D. was present in liquid form in the past.
E. has a different molecular structure than water on Earth.

Answer: D
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Easy
Important Words/Concepts: Mars exploration

71. Cyanobacteria

A. first evolved about 2.5 billion years ago.
B. are sensitive to extreme conditions.
C. added carbon dioxide to Earth's early atmosphere.
D. are multicellular organisms.
E. require a warm environment to grow.

Answer: A
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Easy
Important Words/Concepts: early life

72. Which of the following are considered by most scientists to be nonliving?

A. viruses and bacteria that grow in arsenic
B. cyanobacteria and viruses
C. prions and mules
D. cyanobacteria and bacteria that grow in arsenic
E. prions and viruses

Answer: E
DQ: What is the definition of life, and how could Martian life be recognized?
Type: Know It
Difficulty: Easy
Important Words/Concepts: weird life, extreme life

73. Cell membranes are made up of
    A. phospholipids.
    B. phosphates.
    C. potassium.
    D. phosphorus.
    E. proteins.

Answer: A
DQ: What is the basic structural unit of life?
Type: Know It
Difficulty: Easy
Important words/concepts: cell membrane

74. Which part of a cell membrane phospholipid is exposed to the aqueous (watery) exterior?
    A. hydrophilic head and tail
    B. hydrophilic tail
    C. hydrophilic head
    D. hydrophobic head
    E. hydrophobic tail

Answer: C
DQ: What is the basic structural unit of life?
Type: Know It
Difficulty: Hard
Important words/concepts: cell membrane

75. Which part of a cell membrane phospholipid is exposed to the aqueous (watery) interior?
    A. hydrophilic head and tail
    B. hydrophilic tail
    C. hydrophilic head
    D. hydrophobic head
    E. hydrophobic tail

Answer: C
DQ: What is the basic structural unit of life?
Type: Know It
Difficulty: Hard
Important words/concepts: cell membrane

76. Why is a cell membrane like a phospholipid sandwich?
    A. The lipid is the bread and proteins are the spread.
    B. It is a two-layered semipermeable structure with heads on the outside, tails in the middle, and heads on the inside.

C. It is a two-layered semipermeable structure with tails on the outside, heads in the middle, and tails on the inside.
D. It is a two-layered semipermeable structure with tails on the outside, tails on the inside, and heads in the middle.
E. It is a one-layered semipermeable structure with heads on the outside and heads on the inside.

Answer: B
DQ: What is the basic structural unit of life?
Type: Use It
Difficulty: Easy
Important words/concepts: cell membrane

77. What protects a cell from the environment?
A. hydrophobic tails and hydrophilic heads of phospholipids
B. a phospholipid bilayer
C. a semipermeable phospholipid barrier
D. the cell membrane
E. All of the above.

Answer: E
DQ: What is the basic structural unit of life?
Type: Use It
Difficulty: Easy
Important words/concepts: cell membrane

78. All of the following are true of phospholipids EXCEPT
A. they are the primary components of cell membranes.
B. part of the molecule is hydrophobic.
C. the tails of the molecule are hydrophilic.
D. they form a bilayer when placed in water.
E. the tails congregate in the middle.

Answer: C
DQ: What is the basic structural unit of life?
Type: Know It
Difficulty: Easy
Important Words/Concepts: membrane, phospholipid

79. Describe what happens when phospholipids are put into water. How do they arrange themselves?

Answer: Phospholipids arrange themselves in a bilayer with the hydrophobic tails on the inside (protected from water), and the hydrophobic heads arrange themselves on the outside (next to water).

DQ: What is the basic structural unit of life?
Type: Know It
Difficulty: Easy

Important Words/Concepts: membrane, phospholipid

80. Hydrophobic means
    A. not quite alive, like a virus.
    B. something that will not dissolve in water.
    C. water loving.
    D. a solute.
    E. something with a negative charge.

Answer: B
DQ: What is the basic structural unit of life?
Type: Know It
Difficulty: Hard
Important Words/Concepts: hydrophobic

81. Which part of the cell membrane is a barrier to the movement of water into or out of the cell?

Answer: the hydrophobic tails that make up the center of the membrane

DQ: What is the basic structural unit of life?
Type: Use It
Difficulty: Hard
Important Words/Concepts: membrane structure

82. Why do phospholipids form bilayers in water?

Answer: The "head" that contains the phosphate group is hydrophilic and the two tails are hydrophobic. By forming a bilayer, the tails of both sides can be isolated from the water.

DQ: What is the basic structural unit of life?
Type: Use It
Difficulty: Hard
Important Words/Concepts: membrane structure

83. What is the basic structural unit of life?
    A. membranes
    B. molecules
    C. cells
    D. organisms
    E. atoms

Answer: C
DQ: What is the basic structural unit of life?
Type: Know It
Difficulty: Easy
Important Words/Concepts: cell, basic unit of life

84. If you were to dissect a plant into smaller and smaller units, what is the smallest unit that would still be considered alive?

A. whole plant
B. leaves
C. cells
D. cell membranes
E. cell DNA

Answer: C
DQ: What is the basic structural unit of life?
Type: Use It
Difficulty: Easy
Important Words/Concepts: cell, basic unit of life

85. Write A (hydrophobic) or B (hydrophilic) after each term.

A. Will not dissolve in water A
B. Will dissolve in water B
C. Polar molecule B
D. Ionic molecule B
E. Wax A
F. Oil A
G. NaCl B
H. Nonpolar molecule A

DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: Hydrophobic, hydrophilic; Polarity affects how water interacts with molecules.

86. A substance that is dissolved in water is called a

A. solute.
B. solution.
C. solvent.
D. suspension.
E. salt.

Answer: A
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: Polarity affects how water interacts with molecules.

87. Because of the polar nature of water, it is a universal

A. solute.
B. solution.
C. solvent.
D. suspension.

E. salt.

Answer: C
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: Polarity affects how water interacts with molecules.

88. The hydrogen bonds between water molecules are
    A. ionic.
    B. covalent.
    C. strong.
    D. weak.
    E. repellent.

Answer: D
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: Polarity affects how water interacts with molecules; hydrogen bonds

89. The surface tension of water is an example of
    A. capillary action.
    B. adhesion.
    C. cohesion.
    D. covalent bonding.
    E. strong hydrogen bonds.

Answer: C
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: Polarity affects how water interacts with molecules; hydrogen bonds

90. When making sugar water, the sugar is the _____ whereas the water is the _____.
    A. solute; solvent
    B. solvent; solute
    C. solute; solution
    D. solution; solute
    E. solvent; solution

Answer: A
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: solute, solvent, water; Polarity affects how water interacts with molecules.

91. An ion can be formed by

A. the loss of a proton.
B. the gain of a proton.
C. the loss of an electron.
D. the gain of an electron.
E. the loss or gain of an electron.

Answer: E
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: electron, ion

92. Why does ice float on water?

Answer: Water molecules become less densely packed when they freeze, so that they float on top of the more densely packed liquid water molecules.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: Hydrophobic, hydrophilic; Polarity affects how water interacts with molecules.

93. In a water molecule, hydrogen atoms are bonded to oxygen by _____ bonds, whereas neighboring water molecules are held together by _____ bonds.
A. polar covalent; hydrogen
B. hydrogen; polar covalent
C. ionic; polar covalent
D. polar covalent; ionic
E. ionic; hydrogen

Answer: A
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: covalent bond, hydrogen bond, water

94. Why doesn't oil dissolve in water?

Answer: Water only dissolves molecules with charges or that are polar; therefore, oil is electrically neutral and nonpolar. *Or*, oil is hydrophobic.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: Hydrophobic, hydrophilic; Polarity affects how water interacts with molecules.

95. Why do cities add salt to their roads either before or after an ice storm? What does the salt do?

Answer: Salt lowers the freezing temperature of water, and thus limits ice formation or melts ice on roads.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: water, solute, freezing point

96. All of the following are true of water EXCEPT
    A. neighboring molecules are held together by hydrogen bonds.
    B. it is less dense as a solid than as a liquid.
    C. it is a polarized molecule, where the oxygen is slightly positive and the hydrogens are slightly negative.
    D. it is the basis for all life as we know it.
    E. it can dissolve molecules with electrical charges.

Answer: C
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: water; Polarity affects how water interacts with molecules.

97. A solution with a pH less than 7 is called a(n) _____ and has a higher number of _____ than a solution with a pH greater than 7.
    A. base; H^+
    B. acid; H^+
    C. base; OH^-
    D. acid; OH^-
    E. base; both H^+ and OH^-

Answer: B
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: acid, base, pH

98. If 1 liter of a solution with pH = 5 is added to 1 liter of a solution with pH = 9, what will the pH of the mixture be?
    A. 5
    B. 6
    C. 7
    D. 8
    E. 9

Answer: C
DQ: Why is water so important for life and living organisms?

Type: Use It
Difficulty: Hard
Important Words/Concepts: acid, base, pH

99. The attraction water molecules have for other water molecules is called _____, whereas the attraction water molecules have for non-water molecules is called _____.
    a. ionic bonding; cohesion
    b. adhesion; ionic bonding
    c. cohesion; ionic bonding
    d. adhesion; cohesion
    e. cohesion; adhesion

Answer: E
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: adhesion, cohesion, water

100. Why do frozen water pipes break?

Answer: Frozen water pipes break because water is less dense as a solid than as a liquid. Thus, liquid water takes up less space than ice. When liquid water inside a pipe freezes, it expands and can break the pipe.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: characteristics of water

101. The _____ of water molecules explains how some insects can walk on water.
    A. solubility
    B. cohesion
    C. aversion
    D. adhesion
    E. movement

Answer: B
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: cohesion, surface tension

102. Which of the following is NOT a property of water?
    A. All biological molecules will dissolve in water.
    B. Water molecules adhere to charged surfaces.
    C. Water molecules are cohesive to other water molecules.
    D. Due to unequal sharing of electrons, water molecules are polar.

E. Water is liquid at 4 degrees Celsius.

Answer: A
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: characteristics of water, solubility

103. Which form (state of matter) of water do scientists consider to be required for the presence of life?

Answer: liquid

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Easy
Important Words/Concepts: characteristics of water

104. If you add salt to water, how does that affect the freezing point?

Answer: It can lower it to as low as minus 50 degrees Fahrenheit.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Easy
Important Words/Concepts: characteristics of water, freezing

105. What physical feature makes a water molecule polar?

Answer: The electrons are more attracted to the nucleus of the oxygen atom because it is so much larger and more positive. Therefore, they spend more of their time near the oxygen, making that have a net negative charge, and making the region of the hydrogen atoms have a net positive charge.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: characteristics of water, polarity

106. Why does rain fall in drops containing many water molecules, instead of individual molecules?

Answer: Water molecules are attracted to other water molecules because of their polarity. This is called cohesion.

DQ: Why is water so important for life and living organisms?
Type: Use It

Difficulty: Hard
Important Words/Concepts: characteristics of water, cohesion

107. Why can a water strider walk across the surface of a pond, or why can you skip a flat stone across a pond?

Answer: Water molecules are attracted to other water molecules because of their polarity. Their hydrogen-bonding to each other creates surface tension on the body of water. This is called cohesion.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: characteristics of water, cohesion

108. Water is sometimes called the "universal solvent" because so many things dissolve in it. Why is this term misleading? Use specific examples.

Answer: Hydrophobic molecules do not dissolve in water, so it is not a "universal" solvent. The hydrophobic tails of phospholipids do not dissolve in water, nor do hydrocarbons such as oil or gasoline.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: characteristics of water, solubility

109. Which is an example of a molecule that has polar covalent bonds?
    A. salt
    B. phosphorus
    C. carbon dioxide
    D. methane
    E. water

Answer: E
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important words/concepts: water, covalent bonds

110. A solution with a pH of 3.5 would be considered
    A. basic.
    B. neutral.
    C. acidic.
    D. buffered.
    E. saline.

Answer: C

DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: the pH scale

111. A solution with a pH of 8.5 would be considered
    A. basic.
    B. neutral.
    C. acidic.
    D. buffered.
    E. saline.

Answer: A
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: the pH scale

112. The pH scale goes from _____ to_____. A pH of 7 is considered_____, a pH <7 is considered _____, and a pH >7 is considered_____.

Answer: 0; 14; neutral; acidic; basic

DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: the pH scale

113. Acidosis of blood occurs at what pH?
    A. 8
    B. >7.35
    C. <7.35
    D. 2
    E. 4

Answer: C
DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: the pH scale

114. If coffee has a pH of 5 and soda a pH of 4, which is more acidic and by how much?
    A. Coffee is slightly more acidic than soda.
    B. Coffee is 10 times more acidic than soda.
    C. Soda is 10 times less acidic than coffee.
    D. Soda is 10 times more acidic than coffee.
    E. Soda is slightly less acidic than coffee.

Answer: D

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: the pH scale

115. pH is a measure of the
    A. acidity of a solution.
    B. neutrality of a solution.
    C. alkalinity of a solution.
    D. amount of free electrons in a solution.
    E. concentration of hydrogen ions in a solution.

Answer: E
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: pH

116. Pure water has a pH of
    A. 7.
    B. 6.
    C. 12.
    D. 0.
    E. 14.

Answer: A
DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: pH

117. Which has the most free H^+ ions: bases, acids, or pure water?

Answer: acids

DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Easy
Important Words/Concepts: pH

118. Which has the most free OH^- ions: bases, acids, or pure water?

Answer: bases

DQ: Why is water so important for life and living organisms?
Type: Know It
Difficulty: Hard
Important Words/Concepts: pH

119. Solution A has 100,000,000 free H^+ ions/liter.
Solution B has 1,000,000 free H^+ ions/liter.
Solution C has 200,000,000 free H^+ ions/liter.
Solution D has 2,000,000 free H^+ ions/liter.

Which solution is the weakest acid and which solution has the lowest pH?

Answer: Solution B is the strongest base and Solution C has the lowest pH.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: pH

120. Solution A has 100,000,000 free H^+ ions/liter.
Solution B has 1,000,000 free H^+ ions/liter.
Solution C has 200,000,000 free H^+ ions/liter.
Solution D has 2,000,000 free H^+ ions/liter.

Which solution is the strongest acid and which solution has the highest pH?

Answer: Solution C is the strongest acid and Solution B has the highest pH.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: pH

121. Which is worse for you to spill on your hands, a strong acid or a strong base?

Answer: They are both equally bad. Living systems function near pH 7. The further you get from pH 7, the more cellular damage you would get from the reactivity of the acids and bases. Drano (pH 14) and battery acid (pH 0) are both damaging—both will dissolve proteins.

DQ: Why is water so important for life and living organisms?
Type: Use It
Difficulty: Hard
Important Words/Concepts: pH