Biology The Essentials 2nd edition MariÃ«lle Hoefnagels Test Bank

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Chapter 02
The Chemistry of Life

Multiple Choice Questions

1. The primary elements making up living organisms are
A. carbon, hydrogen, oxygen, and calcium.
B. carbon, oxygen, iron, and chlorine.
C. carbon, hydrogen, iron, and calcium.
D. carbon, hydrogen, oxygen, and nitrogen.
E. carbon, oxygen, sulfur, and calcium.

These four elements are required for making the macromolecules which compose all living things. Please see section 2.1

Bloom's Level: 2. Understand
Learning Outcome: 02.00.01 Explain the chemical nature of biological molecules.
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.
Section: 02.01
Topic: Atoms
Topic: Chemical Bonds

2. The atomic number of an atom or element is
A. the number of neutrons in the nucleus.
B. the number of electrons in the nucleus.
C. the number of protons in the nucleus.
D. the number of neutrons in the orbitals.
E. the number of protons in the orbitals.

The atomic number is responsible for defining the elements and its chemistry. Please see section 2.1 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.01.02 Describe the structure of atoms.
Section: 02.01
Topic: Atoms

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3. An ion could be
A. an atom that has gained electrons.
B. an atom that has a positive charge.
C. an atom that has lost electrons.
D. an atom that has a negative charge.
E. All answers are correct.

Ions can be positively or negatively charged due to the gain or loss of electrons. Please see section 2.1 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.01.02 Describe the structure of atoms.
Section: 02.01
Topic: Atoms

4. If you were told to sort cards to into boxes after a lab on elements, you would put into a slot labelled "Mass Number" any card with text that meant
A. the total number of protons, neutrons, and electrons of an atom.
B. the total number of protons and electrons of an atom.
C. the total number of protons and neutrons of an atom.
D. the total number of neutrons and electrons of an atom.
E. the total number of protons of an atom.

Mass number is the total number of large particles in the nucleus of an atom. Please see section 2.1 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.01.02 Describe the structure of atoms.
Section: 02.01
Topic: Atoms

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5. Isotopes of the same element are different from one another in that
A. they have a different number of protons.
B. they have a different number of neutrons.
C. they have a different number of electrons.
D. they are a different element.
E. only one of the isotopes is matter.

Isotopes of the same element behave similarly in chemical reactions since they have the same number of outer shell electrons. Please see section 2.1 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.01.02 Describe the structure of atoms.
Section: 02.01
Topic: Atoms

6. If you were writing the answer key for a professor's exam, and one question asked students to mark a box for the number of outer shell electrons possessed by an element having the maximum number, you would have the key say that the correct answer was
A. one electron.
B. two electrons.
C. four electrons.
D. eight electrons.
E. sixteen electrons.

Two is the maximum number of outer shell electrons. Please see section 2.1 for more information.

Bloom's Level: 3. Apply
Learning Outcome: 02.01.02 Describe the structure of atoms.
Section: 02.01
Topic: Atoms

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7. If an atom has a valence shell that is full, then it
A. is highly reactive.
B. is chemically unstable.
C. is highly likely to combine with other atoms.
D. is found only in a gas form.
E. is inert.

Bloom's Level: 1. Remember
Learning Outcome: 02.01.02 Describe the structure of atoms.
Section: 02.01

8. In a covalent bond
A. atoms share electrons.
B. atoms of opposite charges attract each other.
C. atoms share protons.
D. atoms share neutrons.
E. atoms are repelled by each other.

Sharing electrons leads to strong covalent bonds. Please see section 2.2 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
Section: 02.02
Topic: Chemical Bonds

9. An ionic bond is a bond in which
A. atoms share electrons.
B. atoms share protons.
C. atoms of opposite charges attract each other.
D. atoms share neutrons.
E. atoms are repelled by each other.

Ionic bonds involve ions and transferred electrons. Please see section 2.2 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
Section: 02.02
Topic: Chemical Bonds

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10. Which statement about a bond between sodium and chlorine would lose points on an exam?
A. Na is the chemical symbol for sodium.
B. Chlorine donates an electron.
C. Chlorine becomes negatively charged.
D. Sodium becomes positively charged.
E. The bond that is formed is a strong bond.

In this bond, chlorine gains an electron and sodium loses one. Please see section 2.2 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
Section: 02.02
Topic: Chemical Bonds

11. In the example of ionic bond formation between sodium and chlorine
A. Na is the chemical symbol for chlorine.
B. sodium accepts an electron.
C. chlorine accepts an electron.
D. chlorine becomes positively charged.
E. both sodium and chlorine accept electrons.

In forming the bond in sodium chloride, sodium donates an electron which chlorine accepts. Please see section 2.2 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
Section: 02.02
Topic: Chemical Bonds

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12. If a covalent bond is polar
A. electrons are not shared by atoms.
B. protons are shared by atoms.
C. it will not form in living organisms.
D. the electronegativity of atoms is unequal in their pull on electrons.
E. the bond is weak in strength.

When bonded atoms pull unequally on electrons, the resulting covalent bond is polar, with a net partial charge on each atom. Please see section 2.2 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
Section: 02.02
Topic: Chemical Bonds

13. A hydrogen bond
A. is generally a strong bond.
B. does not occur in living organisms.
C. does not require electron transfer.
D. forms between atoms having the same electronegativity.
E. is a specialized type of covalent bond.

Hydrogen bonds form between adjacent water molecules due to the polar nature of their covalent bonds. Please see section 2.2 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.02.01 Compare and contrast the different types of bonds.
Section: 02.02
Topic: Chemical Bonds

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14. Evaporation is
A. the conversion of a liquid into a vapor.
B. the conversion of a solid into a vapor.
C. the conversion of a vapor into a liquid.
D. the conversion of a vapor into a solid.
E. All answers are correct.

Liquids evaporate as their molecules obtain enough energy to escape from solution into the atmosphere. Please see section 2.3 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Section: 02.03
Topic: Chemical Bonds
Topic: Properties of Water

15. A friend who is not taking your Biology course fills a cup with ice and then a drink. The friend asks you why the ice in the cup is floating, and you are able to say that
A. the molecules are closer together in ice than in liquid water.
B. the molecules are farther apart in ice than in liquid water.
C. ice is denser than liquid water.
D. convection currents caused by temperature differences push upwards on the ice.
E. water vapor is less dense than liquid water.

Water is less dense when frozen than when liquid due to the structure of ice that results because of hydrogen bonding. Please see section 2.3 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Section: 02.03
Topic: Properties of Water

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16. In a chemical equation
A. the reactants are on the right of the yields arrow.
B. reactants and products are on both sides of the yields arrow.
C. the products are on the left of the yields arrow.
D. the reactants are on the left of the yields arrow.
E. the number of atoms of each element may differ on the two sides of the yields arrow.

A chemical reaction shows the progress from reactants to products. Please see section 2.3 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Section: 02.03
Topic: Chemical Reactions
Topic: Properties of Water

17. An acid
A. has a value above 7 on the pH scale.
B. is a chemical that takes hydrogen ions from a solution.
C. has a value of 7 on the pH scale.
D. is a chemical that adds hydrogen ions to a solution.
E. All answers are correct.

Acids have low pH's, with more protons in solution. Please see section 2.4 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Section: 02.04
Topic: Acids and Bases

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18. A base
A. has a value of 7 on the pH scale.
B. is a chemical that adds hydrogen ions to a solution.
C. is a chemical that absorbs hydrogen ions from a solution.
D. has a value below 7 on the pH scale.

Bases take up hydrogen ions and raise pH. Please see section 2.4 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Section: 02.04
Topic: Acids and Bases

19. A substance with a pH of 2 is
A. neutral.
B. a weak acid.
C. a weak base.
D. a strong base.
E. a strong acid.

Strong acids have low pH's, well below the neutral pH of 7. Please see section 2.4 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Section: 02.04
Topic: Acids and Bases

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20. As part of an exam, you are given a powder to analyze. When you perform various tests, you find that it contains a single chemical that changes the pH of neutral water to a pH of 6. You would conclude that the chemical is a
A. weak acid.
B. neutral.
C. weak base.
D. strong acid.
E. strong base.

Weak acids change pH by lowering it, but not by a large amount. Please see section 2.4 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Section: 02.04

21. A substance with a pH of 7 is
A. a weak acid.
B. a weak base.
C. neutral.
D. a strong acid.
E. a strong base.

A pH of 7 means that there is not net excess of hydrogen or hydroxyl ions in solution. Please see section 2.4 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Section: 02.04
Topic: Acids and Bases

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22. As part of a lab exam, you are given a vial of orange crystals. When you add them to pure, neutral pH water, the pH changes to 13. Other tests show that the crystals consist of as single chemical, which you could conclude is
A. a weak acid.
B. a weak base.
C. neutral.
D. a strong acid.
E. a strong base.

Strong bases make pH swing much higher, away from 7. Please see section 2.4 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.04.01 Explain how acids and bases affect pH.
Section: 02.04
Topic: Acids and Bases

23. Organic molecules are defined as chemical compounds that contain
A. hydrophilic solutions.
B. isotopes of carbon.
C. ionically bonded atoms.
D. strong hydrogen bonds.
E. carbon and hydrogen.

Organic molecules, while they may include other elements, by definition must contain hydrogen and oxygen. Please see section 2.5 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.05.01 Explain the relationship between monomers and polymers.
Section: 02.05
Topic: Carbohydrates
Topic: Lipids
Topic: Nucleic Acids
Topic: Proteins

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24. The four major groups of organic compounds are
A. fats, waxes, carbohydrates, and amino acids.
B. carbohydrates, lipids, steroids, and monosaccharides.
C. lipids, fats, waxes, and steroids.
D. carbohydrates, lipids, proteins, and nucleic acids.
E. carbohydrates, proteins, amino acids, and nucleic acids.

All living things are made of carbohydrates, lipids, nucleic acids, and proteins. Please see section 2.5 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.00.01 Explain the chemical nature of biological molecules.
Learning Outcome: 02.05.01 Explain the relationship between monomers and polymers.
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Section: 02.05
Topic: Carbohydrates
Topic: Lipids
Topic: Nucleic Acids
Topic: Proteins

25. You are asked to help prepare a lab and need to label some beakers. In one, you are told, there are sugars polymerizing into a large polymer, so you prepare a label that mentions
A. hydrolysis.
B. reproduction.
C. dehydration synthesis.
D. hydrolysis and dehydration synthesis.
E. unrelated to chemical bonds.

Monomers are turned into polymers in living systems by the removal of water, dehydration. Please see section 2.5 for more information.

Bloom's Level: 3. Apply
Learning Outcome: 02.00.01 Explain the chemical nature of biological molecules.
Learning Outcome: 02.05.01 Explain the relationship between monomers and polymers.
Section: 02.05
Topic: Chemical Bonds
Topic: Molecules

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26. A process by which cells break polymers down into smaller units is
A. hydrolysis.
B. dehydration synthesis.
C. reproduction.
D. hydrolysis and dehydration synthesis.
E. unrelated to chemical bonds.

When water is added chemically to a bond between the subunits in a polymer, breaking that bond, the reaction is a hydrolysis reaction. Please see section 2.5 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Section: 02.05
Topic: Carbohydrates
Topic: Chemical Reactions
Topic: Lipids
Topic: Proteins

27. Imagine that you are in a study session, and your group is taking a practice quiz that members grade for one another. For the question, "A cook decides to cook only using monomers, so what chemicals could the cook use?" you would mark correct if the paper you are grading has this answer as
A. cellulose and sucrose.
B. lactose and sucrose.
C. glucose and fructose.
D. glucose and cellulose.
E. None of the answers are correct.

Monosaccharides are single sugars molecules not linked to any others. Please see section 2.5 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Section: 02.05
Topic: Carbohydrates
Topic: Molecules

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28. You are asked to help solve a murder, and a note from the murdered taunting the police says that the crime was committed using a lipid. What molecule could you exclude from your search?
A. a triglyceride
B. a phospholipid
C. a wax
D. a sterol
E. a starch molecule

Starch is a carbohydrate, not a lipid. Please see section 2.5 for more information.

Bloom's Level: 3. Apply
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Section: 02.05
Topic: Lipids

29. The primary building block (monomer) of proteins is
A. a glucose molecule.
B. a fatty acid.
C. a nucleotide.
D. an amino acid.
E. four interconnected rings.

Proteins are made of amino acids linked by the removal of water. Please see section 2.5 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Section: 02.05
Topic: Molecules
Topic: Proteins

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30. If asked to build a model of an amino acid, you would need parts to represent
A. three R groups and a glycerol.
B. nitrogen, carbon, and an R group.
C. multiple saccharide rings.
D. carbon and phosphorus monomers.
E. carbon and phosphorus.

Amino acids have amino and carboxyl groups in common, and they vary based on the identity of their R groups. Please see section 2.5 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Section: 02.05
Topic: Proteins

31. As part of a lab practical, you are asked to attach explanation to labels on chemical models. To the link between amino acids in a protein you would add a label describing that it is
A. an ionic bond in proteins.
B. a covalent bond in carbohydrates.
C. a covalent bond in proteins.
D. an ionic bond in carbohydrates.
E. a hydrogen bond in nucleic acids.

Peptide bonds link successive amino acids in a protein. Please see section 2.5 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Section: 02.05
Topic: Molecules
Topic: Proteins

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32. The primary building block (monomer) of nucleic acids is
A. a nucleotide.
B. a glucose molecule.
C. a fatty acid.
D. an amino acid.
E. four interconnected carbon rings.

Nucleic acids are polymers, and they are composed of a set of four nucleotides linked by the removal of water. Please see section 2.5 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.05.01 Explain the relationship between monomers and polymers.
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Section: 02.05
Topic: Molecules
Topic: Nucleic Acids

33. Water is best described as which of the following?
A. an ion
B. a nonpolar molecule
C. an atom
D. a polar molecule
E. an element

Water is a polar molecule composed of three atoms of two elements. Please see section 2.3 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Section: 02.03
Topic: Properties of Water

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34. You have been presented with a new compound that is bright purple and that smells of violets. However, it sticks to surfaces in a way similar to water and can replace water in the running of living cells. You might then expect this new molecule to make
A. covalent bonds.
B. ionic bonds.
C. hydrogen bonds.
D. hydrophobic bonds.
E. peptide bonds.

Water molecules' ability to make hydrogen bonds is critical for their function in cells, so any substitute for water would probably make the same bonds. Please see section 2.3 for more information.

Bloom's Level: 4. Analyze
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Section: 02.03
Topic: Properties of Water

35. Within a single molecule of water, ____ bonds are formed between oxygen and hydrogen.
A. ionic
B. covalent
C. hydrogen
D. hydrophobic
E. nuclear

Internal bonds in water molecules are polar covalent bonds. Please see section 2.3 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Section: 02.03

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36. What do a lemon, a toaster oven, and sand grains have in common?
A. All are composed of matter and energy.
B. All are alive.
C. All are composed of organic molecules.
D. All are acidic.
E. All are basic.

All material things are made of matter and have energy in them. Please see section 2.1 for more information.

Bloom's Level: 3. Apply
Learning Outcome: 02.00.01 Explain the chemical nature of biological molecules.
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.
Section: 02.01
Topic: Atoms

37. You can painlessly wade into a pool, but doing a belly flop off of the high diving board hurts because of
A. water's high density.
B. adhesion of your molecules with the water molecules.
C. water's high boiling point.
D. a neutral pH.
E. cohesion of the water molecules.

The cohesiveness of water molecules leads to tighter bonding between them than in other solvents, and thus the difficulty/pain involved in a belly flop. Please see section 2.3 for more information.

Bloom's Level: 3. Apply
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Section: 02.03
Topic: Properties of Water

Scientists use carbon dating to determine the age of fossils. ^{14}C is a rare isotope of carbon that has a half life of 5730 years and decays into ^{14}N. By measuring the amount of ^{14}C remaining in a fossil, scientists can estimate when the organism died to within 60,000 years.

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The atomic numbers of C is 6 and of N is 7.

38. The most common isotope of carbon is ^{12}C. ^{14}C has ____ than ^{12}C.
A. more protons
B. more neutrons
C. fewer neutrons
D. fewer protons
E. more electrons

Higher atomic number means that more neutrons are present, for isotopes of the same element. Please see section 2.1 for more information.

Bloom's Level: 3. Apply
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.
Learning Outcome: 02.01.02 Describe the structure of atoms.
Section: 02.01
Topic: Atoms

39. ^{14}C and ^{14}N have the same
A. atomic number.
B. number of protons.
C. atomic mass.
D. number of neutrons.
E. number of electrons.

Different elements can have the same atomic number depending on what isotopes are being compared. Please see sections 2.1 and 2.2 for more information.

Bloom's Level: 4. Analyze
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.
Learning Outcome: 02.01.02 Describe the structure of atoms.
Section: 02.01
Section: 02.02
Topic: Atoms

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40. Which of the following is NOT an example of matter?
A. wind
B. energy
C. light
D. sound
E. None of the answers are correct.

Wind is the movement of matter, not matter itseld. Please see section 2.1 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.00.01 Explain the chemical nature of biological molecules.
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.
Section: 02.01
Topic: Atoms

41. Hydrogen, nitrogen, carbon, and oxygen account for 96% of the human body. These elements are
A. also the main elements in organic molecules.
B. rare in nonhuman organisms.
C. rare on Earth.
D. always bonded by hydrogen bonds.
E. All answers are correct.

The human body is made, mostly, of organic compounds, so it and organic compounds share common elements. Please see section 2.1 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.00.01 Explain the chemical nature of biological molecules.
Learning Outcome: 02.01.01 Identify the most important elements in living organisms.
Section: 02.01
Section: 02.02
Topic: Atoms

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42. The polymers with the most complex and diverse three-dimensional structures are
A. saturated fats.
B. unsaturated fats.
C. proteins.
D. waxes.
E. carbohydrates.

Proteins generally have more kinds of monomers than other large polymers, so they can have a greater diversity of shapes and functions. Please see section 2.5 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Section: 02.05
Topic: Proteins

True / False Questions

43. Water is a compound.
TRUE

Water is a compound since it contains more than one chemical element. Please see sections 2.2 and 2.3 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.02.02 Differentiate between atoms, molecules, and compounds.
Learning Outcome: 02.03.01 Explain how the structure of water affects its chemical properties.
Section: 02.02
Section: 02.03
Topic: Chemical Bonds
Topic: Properties of Water

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44. Proteins are compound because they are polymers.
FALSE

Proteins are compounds, but because they are made of multiple elements. Please see section 1.2 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.02.02 Differentiate between atoms, molecules, and compounds.
Section: 02.02
Topic: Atoms
Topic: Molecules

Multiple Choice Questions

45. Two hydrogen atoms and an oxygen atom bonded together form
A. a molecule, but not a compound.
B. a compound, but not a molecule.
C. a molecule and a compound.
D. an atom and a molecule.
E. an atom, but not a molecule or compound.

Molecules involve multiple atoms, and compounds involve multiple elements. Please see section 2.2 for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.02.02 Differentiate between atoms, molecules, and compounds.
Section: 02.02
Topic: Atoms
Topic: Molecules

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True / False Questions

46. Some aphids can change color in response to the presence of bacterial symbionts.
TRUE

Baterial symbionts can prompt some aphids to shift color from red to green. Please see section 2.5 and "Investigating Life" for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.06.02 Understand the role of bacterial symbionts in aphid coloration
Section: 02.06
Topic: Molecules
Type: Investigating Life

47. Aphids that change color in response to the presence of bacterial symbionts generally do so as they age.
TRUE

Baterial symbionts can prompt some young aphids to shift color from red to green. Please see section 2.5 and "Investigating Life" for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.06.02 Understand the role of bacterial symbionts in aphid coloration
Section: 02.06
Topic: Molecules
Type: Investigating Life

48. Color changes are not connected to their survival.
FALSE

A color shift in aphids from red to green can lead to camouflage effects and greater survival. Please see section 2.5 and "Investigating Life" for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.06.02 Understand the role of bacterial symbionts in aphid coloration
Section: 02.06
Topic: Molecules
Type: Investigating Life

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Multiple Choice Questions

49. If you add a factor to a culture of sap-sukcing mealy bugs, and they change color from red to green, what might you have added?
A. bacteria
B. seeds
C. caffeine
D. salt
E. wax

This example sounds like the case in which added bacteria caused aphids to change from red to green. Please see section 2.5 and "Investigating Life" for more information.

Bloom's Level: 3. Apply
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Learning Outcome: 02.06.02 Understand the role of bacterial symbionts in aphid coloration
Section: 02.05
Section: 02.06
Topic: Molecules
Type: Investigating Life

50. If you wanted to add a factor to a culture grasshoppers to see if it might cause a color change, what might you try?
A. bacteria
B. seeds
C. caffeine
D. salt
E. wax

Added bacteria can cause some aphids to change from red to green. Please see section 2.5 and "Investigating Life" for more information.

Bloom's Level: 4. Analyze
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Learning Outcome: 02.06.02 Understand the role of bacterial symbionts in aphid coloration
Section: 02.05
Section: 02.06
Topic: Molecules
Type: Investigating Life

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51. If you sprayed antibiotics on purple insects, and they changed color, what did the antibiotics most likely affect?
A. bacteria
B. seeds
C. caffeine
D. salt
E. wax

Added bacteria can cause some aphids to change from red to green, and antibiotics kill bacteria. Please see section 2.5 and "Investigating Life" for more information.

Bloom's Level: 2. Understand
Learning Outcome: 02.05.02 Compare and contrast the structures and functions of the four classes of biological molecules.
Learning Outcome: 02.06.02 Understand the role of bacterial symbionts in aphid coloration
Section: 02.05
Section: 02.06
Topic: Molecules
Type: Investigating Life

True / False Questions

52. Polymers are made of monomers, and both are kinds of compounds.
TRUE

Formation of a polymer implies that several chemical elements are involved in the monomers, so both monomers and polymers must be compounds. Please see section 2.2 for more information.

Bloom's Level: 3. Apply
Learning Outcome: 02.02.02 Differentiate between atoms, molecules, and compounds.
Learning Outcome: 02.05.01 Explain the relationship between monomers and polymers.
Section: 02.02
Section: 02.05
Topic: Atoms
Topic: Molecules

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53. Carbon is a compound.
FALSE

Carbon is a single element, while compounds must involve multiple elements. Please see section 2.2 for more information.

Bloom's Level: 1. Remember
Learning Outcome: 02.02.02 Differentiate between atoms, molecules, and compounds.
Section: 02.02
Topic: Atoms
Topic: Molecules

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