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# **Chapter 02: Chemistry of Life**

### **MULTIPLE CHOICE**

1.	Carbon, hydrogen, and n a. compounds. b. macromolecules.	itrogen are all exan	nples o c. d.	f elements. amino acids.		
	ANS: C DI MSC: Remembering	F: Easy	REF:	2.intro	OBJ:	2.1
2.	<ul><li>The subatomic particles t</li><li>a. isotopes.</li><li>b. protons.</li></ul>	that possess a single	e negat c. d.	ive charge and neutrons. electrons.	surrour	nd the nucleus are the
	ANS: D DI MSC: Remembering	F: Easy	REF:	2.intro	OBJ:	2.1
3.	Nitrogen has seven proto nitrogen? a. 0 b. 7	ns, seven neutrons,	, and se c. d.	even electrons. 14 21	What is	the atomic mass of
	ANS: C DI MSC: Remembering	F: Easy	REF:	2.intro	OBJ:	2.1
4.	Chemists often represent neutrons, and electrons. V a. 15 p, 15 n, 15 e b. 10 p, 10 n, 10 e	the structure of ato Which atom would	oms usi have a c. d.	ng p, n, and e t n atomic weigh 15 p, 0 n, 15 c 0p, 15n, 15 e	o indica at of 30 <sup>4</sup> e	ate the number of protons, ?
	ANS: A DI MSC: Applying	F: Medium	REF:	2.intro	OBJ:	2.1
5.	<ul> <li>O<sub>2</sub>, also termed <i>atmosphe</i></li> <li>a. It contains no covale</li> <li>b. It contains a double of</li> <li>c. To be considered a covygen is too small.</li> <li>d. Compounds are defined</li> </ul>	eric oxygen, is cons nt bonds. covalent bond but n ompound there mu ned as molecules co	sidered not a sin st be a onstruc	to be a molecungle covalent be minimum of th ted from two or	le but n ond. ree ator	not a compound. Why not? ms; atmospheric different elements.
	ANS: D DI MSC: Evaluating	F: Easy	REF:	2.intro	OBJ:	2.2
6.	How many atoms are pre a. 4 b. 8	esent in a single mo	lecule c. d.	of C <sub>8</sub> H <sub>10</sub> N <sub>4</sub> O <sub>2</sub> ? 12 24		
	ANS: D DI MSC: Applying	F: Easy	REF:	2.intro	OBJ:	2.2
7.	The chemical reaction the are the reactants? a. H <sub>2</sub> O and CO <sub>2</sub>	at represents photo	synthes c.	sis is $6 H_2O + 6$ $H_2O$ and $O_2$	$CO_2 \rightarrow$	$C_6H_{12}O_6 + 6 O_2$ . What

	b. $C_6H_{12}O_6$ and $CO_2$	2		d.	$C_6H_{12}O_6$ and $O_6$	$CO_2$	
	ANS: A MSC: Applying	DIF:	Easy	REF:	2.intro	OBJ:	2.2
8.	Which of the following a. water (H <sub>2</sub> O) b. methane (CH <sub>4</sub> )	ng is an	organic compo	ound? c. d.	ammonia (NH carbon dioxid	H <sub>3</sub> ) le (CO <sub>2</sub>	)
	ANS: B MSC: Applying	DIF:	Medium	REF:	2.intro	OBJ:	2.2
9.	A group of astronauts They found that one of statements must be co a. The compounds of b. The samples must c. The samples must d. The specimen must	s return of their orrect al must be st lack v st contai ust lack	ing from outer samples was co bout their samp covered with a vater, but conta in carbon atoms water, pesticid	space s bated w bles? ummoni in DNA s. es, and	tudied samples ith organic con a (NH <sub>3</sub> ) and wa A. added hormone	taken f npound ater vap es.	from their lunar landing. s. Which of the following por.
	ANS: C MSC: Evaluating	DIF:	Medium	REF:	2.intro	OBJ:	2.2
10.	The central element f a. calcium. b. carbon.	found in	organic molec	ules is c. d.	silicon. sodium.		
	ANS: B MSC: Remembering	DIF:	Easy	REF:	2.intro	OBJ:	2.5
11.	Which of the following atmosphere? a. nucleotides	ng is a 1	nonomer that c	an be c c.	ommonly made triglycerides	e from	components in Earth's
	ANS: B OBJ: 2.6	DIF: MSC:	Easy Remembering	REF:	OnePictureAT	Thousar	ndExperiments
12.	In the chemical react electrons creating a. covalent b. peptide	ion that	forms hydroge bonds between	n perox the tw c. d.	kide (H <sub>2</sub> O <sub>2</sub> ), hy o atoms. hydrogen ionic	drogen	and oxygen share
	ANS: A OBJ: 2.2	DIF: MSC:	Easy Applying	REF:	WorldofWater	r	
13.	Individual water mole between them.	ecules o	orient toward ea	ach othe	er because of th	ie	bonds that form
	<ul><li>a. covalent</li><li>b. peptide</li></ul>			с. d.	nydrogen ionic		
	ANS: C OBJ: 2.2	DIF: MSC:	Easy Remembering	REF:	WorldofWater	r	
14				1 <i>.</i>		1 0	

14. Which of the following distinguishes ionic bonds from covalent bonds?a. Ionic bonds form between the same two elements, whereas covalent bonds form between

different elements.

- b. Ionic bonds hold together compounds that do not dissolve in water, whereas covalent bonds hold together molecules that dissolve in water.
- c. Ionic bonds hold together oppositely charged atoms, whereas covalent bonds hold together atoms that share electrons.
- d. Ionic bonds consist of atoms with partial charges, whereas covalent bonds consist of atoms with full positive and negative charges.

ANS:	С	DIF:	Medium	REF:	WorldofWater
OBJ:	2.2	MSC:	Remembering		

15. When calcium (Ca++) and chloride (Cl<sup>-</sup>) interact with one another they bond using \_\_\_\_\_\_ bonds.

<ul><li>a. hydrogen</li><li>b. peptide</li></ul>			с. d.	covalent ionic
ANS: D OBJ: 2.2	DIF: MSC:	Medium Applying	REF:	WorldofWater

16. Which of the following types of bonds hold hydrogen and oxygen atoms together within an individual water molecule?

<ul><li>a. hydrogen bond</li><li>b. peptide bond</li></ul>	l		c. d.	polar covalent bond ionic bond
ANS: C	DIF:	Medium	REF:	WorldofWater
OBJ: 2.2	MSC:	Remembering		

17. Which of the following is likely to participate in ionic bonding?

a. Li <sup>+</sup>		с.	He
b. H <sub>2</sub> O		d.	C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>
ANS: A OBJ: 2.2	DIF: Medium MSC: Analyzing	REF:	WorldofWater

- 18. Which of the following is correct about hydrogen bonds?
  - a. Individually, hydrogen bonds are very strong.
  - b. They form between neighboring oxygen atoms.
  - c. They do not involve binding with a hydrogen atom.
  - d. They form due to partial positive and partial negative charges on atoms.
  - ANS: D DIF: Difficult REF: WorldofWater
  - OBJ: 2.2 MSC: Remembering
- 19. Based on the water molecule pictured below, which of the labeled areas possesses a partial negative charge?



20. If iodide ions (I<sup>-</sup>) were dissolved in water, they would be attracted to



- 21. Neighboring water molecules are held together with hydrogen bonds because
  - a. partially negatively charged oxygen atoms and partially positively charged hydrogen atoms on separate water molecules are attracted to one another.
  - b. the hydrogen and oxygen atoms within a single water molecule share electrons equally.
  - c. the oxygen and hydrogen atoms that participate in hydrogen bonding are sharing electons within a single valence shell.
  - d. ionic interactions repel water molecules from hydrophobic oils that may be present in a solution.

ANS:	А	DIF:	Difficult	REF:	WorldofWater
OBJ:	2.3	MSC:	Evaluating		

- 22. Which of the following explains why ice floats on water?
  - a. The crystal structure of ice is more regular than that seen in liquid water.
  - b. The distance between water molecules in ice is greater than in liquid water.
  - c. The cool temperature of ice reduces the extent of molecular motion relative to liquid water.

d. When ice forms, the hydrogen bond in the water molecule becomes nonpolar; ice behaves like oil.

ANS:	В	DIF:	Difficult	REF:	WorldofWater
OBJ:	2.3	MSC:	Understanding	5	

- 23. When sodium chloride (Na<sup>+</sup>Cl<sup>-</sup>) is dissolved in water, the sodium ion
  - a. is attracted to the hydrogen atoms of water molecules.
  - b. is repelled by the oxygen atoms of water molecules.
  - c. is attracted to other sodium ions that are being dissolved.
  - d. is attracted to the oxygen atoms of water molecules.

ANS:	D	DIF:	Medium	REF:	WorldofWater
OBJ:	2.4	MSC:	Analyzing		

- 24. Oil and water do not mix together well because
  - a. water is polar and oil is nonpolar.
  - b. only identical molecules of the same chemical can easily mix together.
  - c. water has hydrogen bonds and oil is polar.
  - d. water and oil are covalently bonded together.

ANS:	А	DIF:	Medium	REF:	WorldofWater
OBJ:	2.4	MSC:	Applying		

- 25. You are given an unknown substance and asked to determine whether it is polar or nonpolar. The easiest way to do this would be to
  - a. determine whether the compound is held together by hydrogen bonds.
  - b. determine the number of electrons in the compound's outer shell.
  - c. mix the compound with an ionic substance to see whether its bonds can withstand the pressure.
  - d. determine whether the compound dissolves in water.

ANS:	D	DIF:	Medium	REF:	WorldofWater
OBJ:	2.4	MSC:	Understanding	5	

26. In making your morning tea, you drop a sugar cube into the hot water. You stir the mixture but no longer see the sugar cube at the bottom of your mug. In this scenario, the sugar is

A N 1	<b>G</b> . <b>D</b>	DIE.	Madin	DEE.	Westlater
b.	the solvent.			d.	a solute.
a.	nonpolar.			с.	an acıd.

ANS: DDIF: MediumREF: WorldofWaterOBJ: 2.4MSC: Applying

27. In making your morning tea, you drop a sugar cube into some hot water. You stir the mixture but no longer see the sugar cube at the bottom of your mug. Based on your observation of sugar dissolving in hot water, you properly conclude that the sugar is

<ul><li>a. hydrophobic.</li><li>b. nonpolar.</li></ul>		с. d.	hydrophilic. inert.
ANS: C OBJ: 2.4	DIF: Medium MSC: Applying	REF:	WorldofWater

- 28. A carwash attendant offers to treat your windshield with a protective agent. This substance coats the glass, causing beads of water to easily roll off during a rain shower. Which of the following must be correct about the protective agent?
  - a. It resists temperature changes well. c. It is a polar substance.

	b. It must be an acid	d.	d.	It must be hydrophobic.
	ANS: D OBJ: 2.4	DIF: Medium MSC: Applying	REF:	WorldofWater
29.	The pH scale measur a. the amount of wa b. the likelihood tha c. the concentration d. the number of ato	es ater in a solution. at a solution will evapo a of hydrogen ions in a oms found within a mo	orate. solutio blecule.	n.
	ANS: C OBJ: 2.4	DIF: Medium MSC: Remembering	REF:	WorldofWater
30.	In living systems, a c a. carbon dioxide. b. calcium.	ritical component of m	nany rea c. d.	actions is water. hydrogen sulfide.
	ANS: C OBJ: 2.4	DIF: Medium MSC: Remembering	REF:	SmellofSuccess
31.	How many different a. 90 b. 20	amino acids are used to	o build c. d.	proteins? 19 4
	ANS: B OBJ: 2.6	DIF: Easy MSC: Remembering	REF:	SmellofSuccess
32.	Which of the following a. methionine b. leucine	ng amino acids begins	the cor c. d.	nstruction of all proteins in the human body? proline tryptophan
	ANS: A OBJ: 2.6	DIF: Easy MSC: Remembering	REF:	SmellofSuccess
33.	Antibodies are an imp fragmented antibodie recover?	portant class of human es under laboratory con	protein ditions	ns that function in immune defense. If scientists , what chemical building blocks would they
	<ul><li>a. monosaccharides</li><li>b. phospholipids</li></ul>	3	с. d.	amino acids nitrogenous bases
	ANS: C OBJ: 2.6	DIF: Medium MSC: Applying	REF:	SmellofSuccess
34.	Which of the following asteroid originated in a. the presence of v b. the absence of conc. the presence of rid. the absence of hyperbolic concepts of the absence of the presence of the prese	ng pieces of evidence outer space? olcanic ash on the outs ommon gases found in ight-handed amino acid ydrogen bonds betweer	would t side of t Earth's ds in the n water	best demonstrate that a bacterium found on an the bacterial cell atmosphere e bacterium's proteins molecules in the bacterial cell
	ANS: C OBJ: 2.6	DIF: Medium MSC: Applying	REF:	SmellofSuccess
35.	An acid is a polar sub	ostance that dissolves i	n water	and

a. becomes nonpolar.

	<ul><li>b. leaves behind an</li><li>c. accepts hydroger</li><li>d. donates hydroger</li></ul>	OH <sup>-</sup> ion. 1 ions from the solutio 1 ions to the solution.	n.	
	ANS: D OBJ: 2.4	DIF: Easy MSC: Applying	REF:	GettingtheRightMix
36.	A solution with a pH a. acidic. b. basic.	of 3 is	c. d.	nonpolar. neutral.
	ANS: A OBJ: 2.4	DIF: Easy MSC: Applying	REF:	GettingtheRightMix
37.	Of the following valu a. 5 b. 7	ues, which indicates th	e most l c. d.	basic pH? 8 10
	ANS: D OBJ: 2.4	DIF: Easy MSC: Applying	REF:	GettingtheRightMix
38.	Which of the followi a. pH 1 b. pH 4	ng solutions has the hi	ighest co c. d.	oncentration of free H <sup>+</sup> ions? pH 7 pH 14
	ANS: A OBJ: 2.4	DIF: Medium MSC: Applying	REF:	GettingtheRightMix
39.	After adding a small 3. Solution A must c	amount of Solution A ontain	to Solu	tion B, the pH of Solution B declines from 8 to
	<ul><li>a. a salt.</li><li>b. a base.</li></ul>		с. d.	water only. an acid.
	ANS: D OBJ: 2.4	DIF: Medium MSC: Applying	REF:	GettingtheRightMix
40.	When ammonia (NH Ammonia is therefor	3) is dissolved in a sol	ution, it	accepts hydrogen ions from its surroundings.
	<ul><li>a. a base.</li><li>b. an isotope.</li></ul>		c. d.	a salt. an acid.
	ANS: A OBJ: 2.4	DIF: Medium MSC: Applying	REF:	GettingtheRightMix
41.	Carbon atoms are bo a. ionic bonds. b. polar bonds.	und to each other by	с. d.	hydrogen bonds. covalent bonds.
	ANS: D OBJ: 2.5	DIF: Medium MSC: Remembering	REF:	LifesFirstSteps
42.	Which of the followi	ng factors explains ca	rbon's p	rominence in living systems?

- a. Carbon forms weak reversible bonds.
- b. Carbon bonds with up to three other atoms.c. Carbon-based molecules can form long chains and rings.d. Carbon does not form small molecules.

- ANS: C DIF: Difficult REF: LifesFirstSteps
- OBJ: 2.5 MSC: Remembering
- 43. Which of the following statements is true of proteins, carbohydrates, and nucleic acids?
  - a. All three are used to store genetic information.
  - b. None of these macromolecules mixes well with water.
  - c. Each of these molecules is built from a common set of monomers.
  - d. All of these molecules are primarily used as energy-storage molecules.

ANS:	С	DIF:	Medium	REF:	LifesFirstSteps
OBJ:	2.6	MSC:	Remembering		_

44. In the laboratory you identify protein in a food item that you've tested. Which of the following must the food item also contain?

a. glucose b. lipids			с. d.	amino acids nucleotides
ANS: C OBJ: 2.6	DIF: MSC:	Difficult Understanding	REF:	LifesFirstSteps

45. Macromolecules are typically formed by repetitively adding small monomers together. Which macromolecule is properly matched with the appropriate monomer?

	<ul><li>a. polypeptide—amino acid</li><li>b. nucleic acid—amino acid</li></ul>			polysaccharide—nucleotide triglyceride—cholesterol		
	ANS: A OBJ: 2.6	DIF: Easy MSC: Applying	REF:	FiftyMoreYears		
46.	A disaccharide consis a. sugars. b. hydrocarbons.	sts of two	c. d.	fatty acids. amino acids.		
	ANS: A OBJ: 2.6	DIF: Easy MSC: Remembering	REF:	FiftyMoreYears		

#### 47. Nucleotides

- a. are the building blocks of proteins.
- b. are involved in every chemical reaction in the cell.
- c. form physical structures such as hair.
- d. are the building blocks of nucleic acids.

ANS:	D	DIF:	Easy	REF:	FiftyMoreYears
OBJ:	2.6	MSC:	Remembering		

48. The genetic material found in all living things is made of building blocks called
a. nucleotides.
b. monosaccharides.
c. phospholipids.
d. steroids.

ANS: ADIF: MediumREF: FiftyMoreYearsOBJ: 2.6MSC: Understanding

- 49. Which of the following are composed of the same monomers?
  - a. proteins and DNAb. RNA and cellulosec. starch and cellulosed. cholesterol and sucrose

#### ANS: C DIF: Medium REF: FiftyMoreYears

OBJ: 2.6 MSC: Applying

50.	Which of the followi a. glucose b. protein	ng is the largest in size	e? c. d.	carbon atom nucleotide
	ANS: B OBJ: 2.6	DIF: Difficult MSC: Understandin	REF: g	FiftyMoreYears

51. Which of the following could be built solely from glucose molecules?

a. b.	fat Dl	ty acids NA				с. d.	oils starch
AN	S:	D	I	DIF:	Difficult	REF:	FiftyMoreYears
OR.	J:	2.6	1	MSC:	Remembering		

52. A scientist observed a chemical that changes to bright red in the presence of organic compounds containing nitrogen and phosphorus. To test this chemical, a set of test tubes each containing a purified sample of one of the following organic compounds is prepared. The chemical is then added to each tube. Which test tube will always turn bright red?

a.	. the tube containing nucleic acids				the tube containing carbohydrates
b.	the tube containing	ng prote	eins	d.	the tube containing phospholipids
AN OB	S: A J: 2.6	DIF: MSC:	Difficult Applying	REF:	FiftyMoreYears

53. Your supervisor provides you with lipids, carbohydrates, proteins, and nucleic acids and asks you to determine their chemical components. Which of the following elements would you NOT expect to find in these items?

a. phospho	rus	c.	hydrogen
b. iron		d	nitrogen
ANS: B	DIF: D	ifficult REF:	FiftyMoreYears
OBJ: 2.6	MSC: R	emembering	

- 54. Which of the following most commonly represents the shape associated with functional proteins?
  - a. a long linear chain of amino acids
  - b. individual amino acids that are not covalently joined together
  - c. coils and sheets of joined amino acids
  - d. three-dimensional folded chains of amino acids

ANS:	D	DIF:	Difficult	REF:	FiftyMoreYears
OBJ:	2.6	MSC:	Remembering		

- 55. One of the symptoms of kidney disease is the presence of proteins in a patient's urine. To quickly test for kidney disease using a urine sample, a doctor might add a chemical that causes a color change when
  - a. nitrogen, but not oxygen, is present.
  - b. nitrogen, but not phosphorus, is present.
  - c. only oxygen and hydrogen are present.
  - d. only carbon and hydrogen are present.

ANS:	В	DIF:	Difficult	REF:	FiftyMoreYears
OBJ:	2.6	MSC:	Applying		

- 56. We use soap to clean ourselves better than we could with water alone. Soaps contain phospholipids that are responsible for the cleansing action. Which of the following statements is the most likely explanation for how soaps work?
  - a. Phospholipids are ions and therefore mix with both the water and oily dirt.
  - b. Phospholipids are completely hydrophilic, and therefore oily dirt takes the place of the phospholipid molecules that would be dissolved in the rinse.
  - c. The phospholipid tail attaches to the oily dirt while the phospholipid head interacts with the rinse water and carriers the dirt (and soap) away with it.
  - d. The nonpolar fatty acid chains that make up the heads of the phospholipid are hydrophilic, and thus are repelled by the water.

ANS:	С	DIF:	Difficult	REF:	FiftyMoreYears
OBJ:	2.6	MSC:	Applying		

## COMPLETION

1.	The positively charged subatomic particle is located in the							
	ANS:	nucleus						
	DIF:	Easy	REF:	2.intro	OBJ:	2.1	MSC:	Remembering
2.	An ins	strument that id	lentifies	chemicals base	ed upon	their weights	is the _	
	ANS:	mass spectron	neter					
	DIF: OBJ:	Easy 2.6	REF: MSC:	OnePictureAT Remembering	housan	dExperiments		
3.	An ato	om that become	es charg	ed due to the ga	ain or lo	oss of an electro	on is ca	llled a(n)
	ANS:	ion						
	DIF: MSC:	Easy Remembering	REF:	WorldofWater	•		OBJ:	2.2
4.	Molec	cules with an un	neven di	istribution of ch	arge ar	e described as		·
	ANS:	polar						
	DIF: MSC:	Medium Remembering	REF:	WorldofWater	•		OBJ:	2.3
5.		molecules	are non	polar molecule	s that a	re repelled by v	water.	
	ANS:	Hydrophobic						
	DIF: MSC:	Medium Remembering	REF:	WorldofWater	•		OBJ:	2.4
6.	The n	umber that repr	esents r	neutrality on the	e pH sca	ale is	_·	
	ANS:	7						

	DIF: Easy REF: SmellofSuccess MSC: Remembering	OBJ:	2.4
7.	The element makes up the chemical backbone of most	molecu	les on planet Earth.
	ANS: carbon		
	DIF: Easy REF: LifesFirstSteps MSC: Remembering	OBJ:	2.5
8.	The class of macromolecules that do NOT form true polymers ar	e the	
	ANS: lipids		
	DIF: Easy REF: FiftyMoreYears MSC: Remembering	OBJ:	2.6

## SHORT ANSWER

1. Nitrogen has an atomic number of 7 and an atomic mass number of 14. Using the image provided, diagram the location and number of protons, neutrons, and electrons in nitrogen.



ANS:

The atomic number tells us the number of protons, whereas the atomic mass is the sum of protons and neutrons. Therefore, nitrogen has 7 protons, 7 neutrons, and 7 electrons. In the diagram, students should demonstrate that there are 7 protons and 7 neutrons in the atomic nucleus. The 7 electrons should be drawn in the shells.

DIF: Easy REF: 2.intro OBJ: 2.1 MSC: Understanding

2. Lithium, with an atomic number of 3, has a tendency to lose electrons when it chemically bonds to another atom. What type of chemical bonds does lithium usually form with other atoms? Explain how you determined your answer.

ANS:

When lithium loses electrons it becomes positively charged and participates in ionic bonding. Since lithium is positively charged it will interact with negatively charged atoms.

DIF: Medium REF: WorldofWater OBJ: 2.2 MSC: Understanding 3. During a study session, a Biology classmate holds up a bottle of water and mentions that there are both hydrogen bonds and covalent bonds found within the liquid. Explain your classmate's statement by describing the types of bonds that are found within your bottle of water.

ANS:

Your classmate is correct in his or her assessment of the bonds in the water. Within a water molecule, the hydrogen and oxygen atoms are held together by covalent bonds. Hydrogen bonds attract neighboring water molecules due to partial positive and partial negative charges on the hydrogen and oxygen atoms, respectively.

DIF: Medium REF: WorldofWater OBJ: 2.3 MSC: Understanding

4. After giving a baby a bath, a new mom applies baby oil to her child's skin. How does the baby oil help the baby's skin to retain moisture throughout the day? Explain the chemical basis of water retention in this example.

### ANS:

Because the oil is hydrophobic and the water is hydrophilic, the two substances do not mix well. Coating the baby's skin with baby oil surrounds the skin with a thin barrier that helps to prevent the loss of moisture since the two substances do not interact with each other. The two fail to mix because they do not share the same charged nature. Although water is electrically neutral, the oxygen and hydrogen ends of the molecule possess partial charges. The baby oil on the other hand is held together by nonpolar covalent bonds, so it has no partial charges.

DIF:	Difficult	REF:	WorldofWater	OBJ:	2.4
MSC:	Understanding	5			

5. There are four major classes of macromolecules that are found in living systems and each uses a carbon skeleton as its structural backbone. Why is carbon regularly assembled to make important biological molecules?

ANS:

All of the major biological molecules (macromolecules) of living systems are organic molecules. As such, these molecules are formed using a carbon skeleton. This element is a central player because its small size and need for four covalent bonds. Carbon readily participates in covalent bonding with other carbon atoms, forming single, double, and triple bonds. Carbon-carbon bonds may also branch or form rings. The carbon-carbon bond is also quite stable, which ensures the integrity of biological molecules in living systems.

DIF:	Easy	REF:	LifesFirstSteps	OBJ:	2.5
MSC:	Remembering				

6. For each of the major classes of macromolecules, indicate the basic subunits used to build it.

ANS:

Carbohydrates are composed of monomers called monosaccharaides. When amino acids are joined together by peptide bonds they form proteins. Nucleic acids like DNA and RNA are built from nucleotide monomers. Lipids are not constructed in the same manner as the other three classes of macromolecules. This diverse class of macromolecules does not share a common monomer.

DIF:	Easy	REF:	LifesFirstSteps	OBJ:	2.6
MSC:	Remembering				

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## MATCHING

Using the answer choices below (a through d), match the characteristic with its macromolecule class.

- a. lipids
- b. carbohydrates
- c. nucleic acids
- d. proteins
- 1. participate in nearly every chemical reaction in living systems
- 2. store and transmit genetic information
- 3. speed chemical reactions
- 4. act as short-term energetic molecules
- 5. form the major framework of biological membranes
- 6. exhibit various levels of structure
- 7. function energy storage and structural support
- 8. used to create steroid molecules like cholesterol

1.	ANS:	D	DIF:	Easy	REF:	LifesFirstSteps
	OBJ:	2.6	MSC:	Remembering		_
2.	ANS:	С	DIF:	Easy	REF:	LifesFirstSteps
	OBJ:	2.6	MSC:	Remembering		
3.	ANS:	D	DIF:	Easy	REF:	LifesFirstSteps
	OBJ:	2.6	MSC:	Remembering		
4.	ANS:	В	DIF:	Easy	REF:	LifesFirstSteps
	OBJ:	2.6	MSC:	Remembering		
5.	ANS:	А	DIF:	Easy	REF:	LifesFirstSteps
	OBJ:	2.6	MSC:	Remembering		
6.	ANS:	D	DIF:	Easy	REF:	LifesFirstSteps
	OBJ:	2.6	MSC:	Remembering		
7.	ANS:	В	DIF:	Easy	REF:	LifesFirstSteps
	OBJ:	2.6	MSC:	Remembering		
8.	ANS:	А	DIF:	Easy	REF:	LifesFirstSteps
	OBJ:	2.6	MSC:	Remembering		