

BIOLOGY TEST #4: Biochemistry Test – STUDY GUIDE

The Biochemistry test will take place on Tuesday, November 10th. Short answer and essay questions should be answered in **complete sentences**, if you fail to do so you will not receive full credit. Use your notes and text book as your primary sources for preparing for the test. Read through the list of concepts and terms listed below from the notes. If you can recall the answer to the question right away, you should be able to do so for the test. Focus your attention on those concepts and terms that you do not remember or have difficulty with.

1. Explain how the properties of water enable (a) water uptake from roots to leaves in plants, (b) transpiration in plants, (c) thermoregulation in organisms and in organisms' environments, (d) metabolic processes in organisms.
2. Explain the role of buffers in maintaining the pH of blood, soil, and rivers/lakes. Why does pH have to be maintained within certain limits?
3. Explain why carbon is capable of forming so many different types of organic molecules.
4. How are the terms macromolecule and polymer different?
5. Describe the process of dehydration synthesis and hydrolysis. (Make sure you know what happens to bonds, energy, and water.)
6. Explain the role of hydrolysis in digestion. Why do we do this? What happens to the monomers produced in the process?
7. Describe the three functions of carbohydrates.
8. Describe the formula of a monosaccharide.
9. Who produces sugar? Through what process?
10. Who uses sugar? For what? Through what process?
11. What is the function of starch? Who makes it? Why do they make it? From what?
12. How are animals like humans able to utilize starch? What makes this possible?
13. What is the function of cellulose? Who makes it? From what?
14. List two things that starch and cellulose have in common. List two things that are different about starch and cellulose.
15. Does cellulose offer any nutritional value? What is the function of cellulose in human diets?
16. What two groups of organisms use chitin?
17. How is chitin different from other polysaccharides?
18. How are the lipids distinguished from all the other macromolecules?
19. Why are lipids considered macromolecules but not polymers?
20. Describe the three major functions of fats and oils.
21. Compare the calorie content of one gram of carbohydrate and fat.
22. What are the two molecules needed to make a triglyceride?
23. Distinguish saturated and unsaturated fats in terms of their chemical bonds, consistency and
24. organisms that produce them.
25. Why are unsaturated fats healthier than saturated fats?
26. What is plaque? What impact does it have on your health?
27. What is the major function of a phospholipid?
28. How do phospholipids vary from triglycerides?
29. Draw and describe a phospholipid based on its hydrophobic and hydrophilic ends.
30. Explain how phospholipids align themselves to form cell membranes.
31. List the two sex hormones produced from cholesterol.
32. Describe the function of a hormone.
33. What happens when you have too much cholesterol in the blood?
34. Be able to explain how you test for ALL the organic molecules from our lab
 - o Proteins Starch Monosaccharide Lipids

35. Be able to explain why there can be 100,000 different proteins but only 20 amino acids.
36. Be able to explain the process that forms proteins (polypeptide formation)
37. Be able to give the 6 functions of proteins.
38. Be able to diagram, identify, and describe the 4 levels of protein structure.
 - o Also be able to say which levels apply to ALL proteins.
39. Be able to explain how an alpha helix of a beta pleated sheet keeps its shape.
40. Be able to give an example of a protein that has multiple subunits.
41. Be able to explain what enzyme action is and why every enzyme doesn't fit every substrate.
42. Be able to explain the many differences between DNA and RNA.
43. Be able to explain the significance of base pairing and how purines and pyrimidines are integral.
44. You should be able to describe and *illustrate* the processes of hydrolysis and dehydration synthesis using generic monomers (H - □ - OH).
45. You will be shown illustrations of the monomers of carbohydrates and lipids that you will identify.
46. You should be able to *illustrate* how phospholipids produce cell membranes (their orientation in a phospholipid bilayer). Know which ends are hydrophobic and hydrophilic.
47. Be sure you can describe why the statement "you are what you eat" is so true.

Terms to know:

Organic compound	Amino acids	DNA – deoxyribonucleic acid
Macromolecule	Peptide bond	RNA – ribonucleic acid
Polymer	Polypeptide	Nucleotides
Monomer	Albumin	Phosphate group
Dehydration synthesis	Hemoglobin	5 carbon sugar
Hydrolysis		Organic/nitrogenous base
Carbohydrate	Primary protein structure	Purine
Monosaccharide	Secondary protein structure	Pyrimidine
Polysaccharide	Tertiary protein structure	Double & single stranded
Starch	Quaternary protein structure	Base pairing
Glycogen	Enzyme	Ribosome
Cellulose	Active site	
Chitin	Activation energy	
Lipid	substrate	
Saturated fat	Catalyst	
Unsaturated fat	Alpha helix	
Glycerol	Beta pleated sheet	
Fatty acid	Hydrogen bond	
Triglyceride	Subunit	
Phospholipid	Disulfide bridge	
Hydrophobic/hydrophilic	Collagen	
Steroid		
Cholesterol	Denaturation	
Sex hormones		
Hormone		