

Study Guide
Biochemistry

Name _____
Block _____

Please use this study guide as you prepare for the test. It will be very helpful to you. You will need to collect the main ideas from many of the worksheets, labs and projects that we worked on in this chapter to complete this study guide. You are responsible for all materials from worksheets and labs that we did. As always, save the study guides to prepare for the final exam.

1. a. Molecules that **do not** contain carbon are called _____.
b. Molecules that contain carbon are called _____.
Exceptions to this rule include CO₂ (carbon dioxide) and CO (carbon monoxide).
c. Carbohydrates, Proteins, Lipids, and nucleic acids are all (circle one) organic / inorganic because they contain carbon.
2. List the three elements common to carbohydrates, proteins, lipids and nucleic acids:
i) _____ ii) _____ iii) _____
3. The element that proteins have that carbohydrates and lipids do not have is _____.
4. a. The supportive cell wall of plants is made of _____.
b. Energy is stored in PLANTS as _____.
c. Energy is stored in ANIMALS as _____.
Remember, carbohydrates are stored energy.

For 5-16, use

L. Lipids P. Proteins N. Nucleic Acids C. Carbohydrates I. Inorganic

Please choose L, P, N, C, I for the following questions.

5. Starch and cellulose are _____.
6. Amino acids are the building blocks of _____.
7. Monosaccharides are the simplest form of _____ and usually end in *-ose*.
8. DNA and RNA are _____.
9. Table sugar, or sucrose is a _____.
10. Nucleotides combine to form _____.
11. A key component of cell membranes is (are) _____.
12. Fatty acids and glycerol combine to form _____ plus water.
13. Enzymes are typically _____, and end in *-ase*.
- 14: NaCl _____
- 15: CO₂ _____
- 16: H₂O _____

17. Circle the correct choices, all questions start with, **“What property of water**”

a. allows water to form a “film” on the surface so that a water strider can glide across it?
adhesion / cohesion

b. allows water molecules to “stack” so that a plant can drink? adhesion / cohesion, this is an example of: capillary action / surface tension

c. allows droplets to stick to your car after a rainy day? adhesion / cohesion

d. allows water droplets to form? adhesion / cohesion

18. Is ice MORE or LESS dense (dense means tightly packed) than water? _____

This loose arrangement of water molecules allows ice to float. How would this be helpful to fish in a lake?

19. Use **C** for covalent, **I** for ionic, **H** for hydrogen:

a. This type of bond forms from shared electrons _____

b. This type of bond is very weak, allows water molecules to stick to each other _____.

c. This type of bond occurs when the electron from one atom is transferred to another atom _____.

20. a. What is the ratio of hydrogen to oxygen in a carbohydrate? _____

b. What is the ratio of hydrogen to oxygen in a water molecule? _____

c. Is there a ratio of H to O in a fat molecule, if so, what is it?

21. a. When polymers such as disaccharides, polysaccharides, fat molecules, or proteins are formed, what is released in the process? _____

b. What type of reaction is this?

_____ also called _____

c. When macromolecules break down, what type of reaction is that? _____

22. Monomer is to Polymer as.....

a. monosaccharide is to _____

b. valine plus alanine is to _____

23. Polymer is to monomer as

a. starch is to _____

b. protein is to _____

c. DNA is to _____

24. Fatty acids and amino acids contain a special group called a carboxyl group. Please draw and label the a) structural formula and b) molecular formula of a carboxyl group.

25. a) What molecule group do proteins and amino acids have that is not present in carbohydrates and fats? Answer this by showing or drawing both the molecular formula and structural formula and giving the name of this group.

26-29 Please answer “how many”, by filling in 1, 2 or 3.

26. How many monosaccharides combine to form a disaccharide? _____
(know what type of reaction this is in terms of condensation/dehydration OR hydrolysis)

27. How many fatty acid molecules are needed to form a fat molecule? _____

28. In simple sugars, the ratio of hydrogen to oxygen atoms is _____ to 1.

29. For each fat molecule the number of glycerol molecules needed is _____.

30. What is lactase, and what does it do?

31. a. What 2 environmental factors would cause an enzyme to not work?

b. What physically happens to the enzymes to make it stop working?

32. How do enzymes help biochemical reactions occur? Are they consumed in the reaction?

33. What is activation energy? How is activation energy lowered naturally in animals?

34. What does catalyze mean (as in “catalyze a reaction”?)

35. a) What is a substrate? b) How do enzymes work on a substrate? c) What is the “active site”? Drawing a picture may help in your explanation.

36. _____ have a pH < 7 and _____ have a pH > 7. Each jump in pH is a factor of 10. For example, vinegar with a pH of 2 is _____ times more **acidic/basic** (circle one) than coffee with a pH of 5.

37. Compare the functions that the 4 macromolecules have in your body.

38. *Know the following terms: macromolecule, glycerol, fatty acid, carboxyl group, amino group, catalyst, substrate, enzyme, active site.*

Also, know how to identify a substance as a carbohydrate, lipid, protein, or inorganic molecule when presented with its molecular or structural formula.

39. *Know and understand all notes from class! Also, you should review and understand all homework questions.*

40. *From graphic organizer, match the macromolecule to its monomer or building blocks. Remember, we went over the graphic organizer in class.*

41. *A basic understanding of this information will guarantee you a passing grade, applying it correctly will guarantee you an A.*