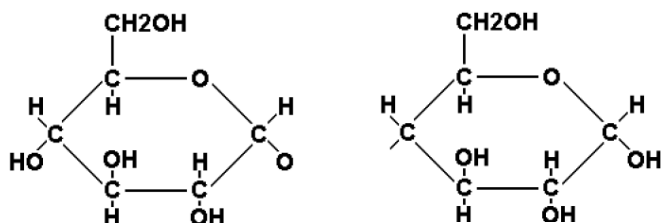


Macromolecules Concept Questions

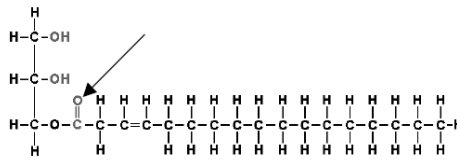
Carbohydrates

1. Explain the relationship between monomers and polymers, using polysaccharides as an example.
2. Why can't cellulose be used by humans as an energy source? Explain.
3. Why is fibre (*i.e.*, cellulose) considered to be an important part of a healthy diet?
4. Name four examples of polysaccharides and state their primary function.
5. Two monomers are being linked together in the diagram below to form what new compound? Complete the bond that joins these two compounds together.



- a. What are the products of this reaction?
- b. What type of linkage connects these two compounds together?
- c. What is the name given to this type of reaction?

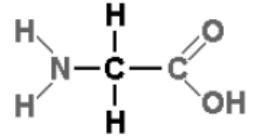
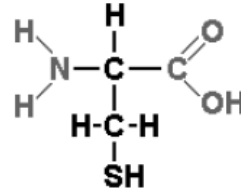
Lipids

6. a) How does the structure of an unsaturated fatty acid differ from the structure of a saturated fatty acid?
b) Give an example of a food that contains each.
 7. Explain why some fatty acids are solid at room temperature while others are liquid.
 8. a) When you consume more food than you need for energy, the excess is stored in the form of lipids. Why are lipids particularly useful for this purpose?
 9. What property do all lipids share? How does this make them ideal for building cell membranes?
 10. Saturated is to single bond as _____ is to double bond.
 11. What functional groups are found in lipids, such as the one found to the right? Circle and identify each group.
- 
12. What is the name of the bond indicated by the arrow in the lipid above?
 13. What type of fatty acid is shown in the lipid above?
 14. How would a polyunsaturated fatty acid differ?
 15. How would a saturated fatty acid differ?
 16. If the lipid above was a triglyceride, how many fatty acids would be linked to the glycerol?
 17. If the lipid above was a phospholipid, how many fatty acids would be linked to the glycerol and what additional group(s) would be present in the molecule?
 18. What type of reaction would occur to link each fatty acid to the glycerol?
 19. List the different types of lipids and state each of their functions.
 20. When a person goes on a diet, stored lipids begin to be digested. What happens chemically when the lipids are digested (broken down)? What is the name given to this process?

Proteins

21. Why can a protein be called a polypeptide but a polypeptide cannot be called a protein?
22. Explain how the 3-dimensional shape of proteins is formed.
23. Use a diagram to show how a peptide bond is formed between two amino acids.
24. Discuss some of the interactions that can occur between the R groups of an amino acid sequence.

25. Some features of amino acids are common while others are not. Explain
26. How does having different R groups make amino acids ideal building blocks for proteins?
27. Why are some amino acids soluble in water while others are not?
28. Name three functions of proteins in a living organism.
29. Which elements are found in proteins but in neither carbohydrates nor lipids.
30. What type of compound is shown to the right?



31. What functional groups are present in both of the compounds found in question 30?

Circle and label all of the functional groups visible.

32. Describe what would have to occur to link the two compounds together. What substance is removed (produced)?

33. What is the name of the bond this is formed between these two compounds?

Nucleic Acids

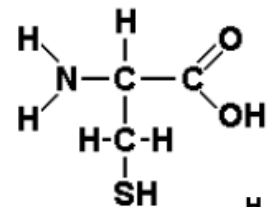
34. Which element is found in nucleic acids but in neither carbohydrates nor proteins?
37. You connect a molecule of ribose, a phosphate, and a molecule of cytosine. What have you made?
38. What does a nucleotide consist of?
32. What are the five nitrogenous bases found in nucleic acids?
33. Differentiate between DNA and RNA.
34. What type of bonds hold the sugar phosphate backbone of DNA & RNA together?
35. What type of bonds hold the nitrogenous bases of DNA together?
36. What is ATP?

Macromolecules

37. Which organic compound(s)/macromolecules are the following functional groups associated with?

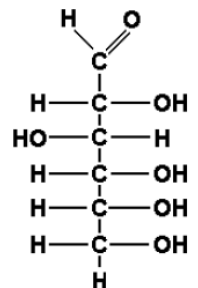
- Phosphate
- Carboxyl
- Hydroxyl

38. How many functional groups can you identify in the compound to the right? Circle and identify each group.

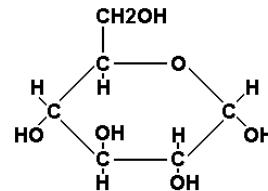


38. What is the name of the compound in question 9?

39. What functional groups can you identify in the compound to the right? Circle and label them and then name the compound.



40. What kind of organic compound is show to the right? What functional groups can you identify? Circle and label one of them.



41. Which of these things is not like the others? Why not?

- (a) fiber (b) sugar (c) starch (d) cellulose (e) fat

42. Name the basic building blocks for each of the following molecules:

- a) Protein _____ (b) Triglyceride _____ (c) Carbohydrate _____ (d) Nucleic acids _____

43. Proteins are to amino acids as polysaccharides are to _____ .