**BI-102 Learning Objectives – Chapter 3: Molecules of Life**

**Fall '08**

1. Be able to explain what makes carbon such a versatile atom.
2. Be able to name and give examples of 3 biologically important *functional groups*.
3. Be able to describe the processes of *condensation* and *hydrolysis*.
4. Be able to concisely state the defining characteristics of *macromolecules* and *polymer* (two separate definitions).
5. Be able to describe how biological polymers are typically formed and broken down.
6. Be able to name and briefly describe each of the 4 classes of biological macromolecules described in class.
7. Be able to state the general chemical formula (and defining characteristic) of carbohydrates.
8. Be able to name 2 common monosaccharides and 2 common disaccharides.
9. Be able to explain how fructose, glucose and galactose can all have the same chemical formula but be chemically different.
10. Be able to state the most important biological functions of monosaccharides, starch, glycogen and cellulose.
11. Be able to name an important function of nucleic acids in general and DNA in particular.
12. Be able to sketch the overall structure (not the individual atomic structure) of a nucleotide (see the three label structures in Figure 3.13).
13. Be able to describe any 4 of the 7 major functions of proteins described in your textbook.
14. Be able to sketch the generic molecular structure of an amino acid.
15. Be able to explain what a *peptide bond* is.
16. Be able to name any 4 of the 6 chemical categories of amino acids.
17. Be able to explain what the *primary structure* of a protein is.
18. Be able to describe the *secondary*, *tertiary* and *quaternary* levels protein structures and, in general terms, how they occur.
19. Be able to explain what protein *motifs* and *domains* are.
20. Be able to explain what physically happens to a protein when it becomes *denatured*, what can cause this and what it typically does to the protein’s ability to function.
21. Be able to concisely state the defining characteristic of lipids.
22. Be able to sketch the overall structure (not the individual atomic structure) of triglycerides.
23. Be able to state the major biological function of triglycerides (fats).
24. Be able to name two types of lipids besides triglycerides.
25. Be able to sketch the overall structure of phospholipids in schematic form (see Figure 3.29).
26. Be able to describe how phospholipids behave in water (See Figure 3.30, note the word *lipid* in this figure and its caption should really be *phospholipid*).
27. Be able to state a major biological function of phospholipids.