Instructional Objectives: Chapter 22. Nucleic Acids

22.1 Types of Nucleic Acids
22.2 Nucleotides: Building Blocks of Nucleic Acids
22.3 Primary Nucleic Acid Structure
22.4 The DNA Double Helix
22.5 Replication of DNA Molecules
22.6 Overview of Protein Synthesis
22.7 Ribonucleic Acids
Chemistry at a Glance: DNA Replication
22.8 Transcription: RNA Synthesis
22.9 The Genetic Code
22.10 Anticodons and tRNA Molecules
22.11 Translation: Protein Synthesis
22.12 Mutations
Chemistry at a Glance: Protein Synthesis
22.13 Nucleic Acids and Viruses
22.14 Recombinant DNA and Genetic Engineering
22.15 The Polymerase Chain Reaction
22.16 DNA Sequencing

Students should be able to:

1. Relate DNA to genes and chromosomes.
2. Describe the structure of a molecule of DNA including the base-pairing pattern.
3. Describe the structure of a nucleotide of RNA.
4. Describe the structure of a molecule of RNA.
5. Describe the three kinds of RNA and construct a pictorial representation.
6. Summarize the physiology of DNA in terms of replication and protein synthesis.
7. List the sequence of events in DNA replication and explain why it is referred to as semiconservative.
8. Evaluate the process of transcription.
9. Evaluate the process of translation.
10. Given a DNA coding strand and the genetic code , determine the complementary messenger RNA strand, the codons that would be involved in peptide formation from the messenger RNA sequence, and the amino acid sequence that would be translated.
11. Define mutation.
12. Differentiate between base substitutions and base insertions and/or deletions.
13. Discuss sickle-cell anemia.
14. Describe how viruses are referenced and categorized.
15. Define bacteriophage.
16. Describe the structure and reproductive cycle(s) of viruses.
17. Analyze the HIV virus as an example of a retrovirus.
18. Evaluate the dangers associated with emerging viruses.