Molecular Biology:

1. What is the monomer unit of DNA and what are the three parts of this monomer? Draw a DNA nucleotide. What is the shape of a DNA molecule? If you consider it as a ladder, what makes up the sides of the "ladder"? What makes up the steps of the "ladder"? Where in the cell is DNA found? Diagram a short section of DNA with six bases on one side. (use each possible base at least once)

2. What is the monomer unit of RNA and what are its three parts? What is the shape of an RNA molecule? Where in the cell can RNA found? What are the three different types of RNA studied? Diagram a short section of RNA with six bases. (use each possible base at least once)

3. Name a few differences (physical and/or functional) between DNA and RNA.

4. What is the overall purpose of DNA replication? During which stage (specifically) of the cell cycle does DNA replication occur?

5. In your own words, what are the basic steps in DNA replication? Where in the cell does DNA replication occur? Describe what is meant by "semi-conservative" replication. How could semi-conservative replication provide an advantage the cell?

6. What does the term "gene expression" mean? What are the two major steps involved in protein synthesis? Must DNA replication occur in order for an individual cell to make proteins?

7. In your own words, give a simplified description of what happens during transcription. Briefly outline the steps of transcription.

8. Why is mRNA called a transcript? Where does transcription occur? Why does it have to occur there? Where does the mRNA molecule move after transcription is complete?

9. In your own words, describe what happens during translation. Briefly outline the steps of translation: include at least the terms: mRNA, codon, ribosome, tRNA charged w/ amino acid, anticodon, polypeptide. Where in the cell does translation occur? Why does it have to occur there?

10. What is an anti-codon and on what molecule is it located? By what process are the amino acids joined together?

11. Use the following sequence: TAC CCG TCT ATT GGC TTT GCG. Complete transcription and translation on this sequence. Use your text book or lab manual to find the codon to amino acid codes.

12. In your own words, what is a gene mutation? What do we call things that can cause mutations in DNA? What are the two main types of DNA mutations? Which type is likely to be more damaging to the protein?