Honors Biology – Unit 11 Objectives

1. Vocabulary: Human Genome Project, functional genomics, DNA sequencing, restriction enzymes, gene splicing, target DNA, restriction enzyme, sticky vs. blunt ends, recombinant DNA, polymerase chain reaction (PCR), Taq polymerase, denature, anneal, elongation, restriction fragment length polymorphism (RFLP), electrophoresis, Southern blot, probe, gene therapy, germ-line therapy, somatic therapy, vector, & single nucleotide polymorphism (SNP).

2. Explain how the process of electrophoresis works and perform RFLP analysis by examining a stained gel.

3. Describe the Southern blot technique and explain why it is necessary for DNA fingerprinting.

4. Given a gene and target DNA, evaluate restriction enzymes to determine which will be best suited for the procedure. Describe why your choice is best.

5. Perform and/or describe DNA sequencing in any of the following ways:
   a) Describe how to set up the technology (stop nucleotides, etc.) and what the results will be.
   b) Given a series of colored bands on a gel, determine the length and sequence of all the fragments on the gel.
   c) Given fragments of various lengths and colors, predict the banding pattern produced by electrophoresis.

6. Describe how to conduct a PCR cycle and explain its "exponential" nature.

7. Describe what gene therapy is and how it is done. Also explain the difference between the end results of germ-line and somatic gene therapy.

8. Explain the importance of sequencing more than one restriction enzyme digest when trying to assemble chromosomal fragments into the correct genomic order.

9. Given the electrophoresis results of standard fragments and a plasmid digested with various restriction enzymes, create a map of the plasmid that shows the location of and distance between each recognition site.