**Protein Synthesis Objective Sheet**

**Tested Objectives**

Bio.3.1.2 Explain how DNA and RNA code for proteins and determine traits.

Bio.3.1.3 Explain how mutations in DNA that result from interactions with the environment (i.e. radiation and chemicals) or new combinations in existing genes lead to changes in function and phenotype.

Bio 4.1.2 Summarize the relationship among DNA, proteins and amino acids in carrying out the work of cells and how this is similar in all organisms

**Essential Vocabulary (ALL must be defined for full credit)**

Protein synthesis, gene, protein, codon, transcription, messenger RNA, ribose, uracil, translation, ribosomal RNA, transfer RNA, anticodon, amino acid, peptide bond, polypeptide, gene expression, differentiation, gene regulation, point mutation (substitution), frameshift mutation (deletion / addition), gamete

**Questions to master (ALL MUST BE ANSWERED FOR FULL CREDIT)**

1. Describe the differences in DNA and RNA structure, including the three types of RNA.
2. Explain the relationship between nitrogen cases, a DNA triplet, an mRNA codon, and an amino acid
3. Explain the relationship between a gene, a protein, and a trait.
4. Analyze the parts of the cell that are related to protein synthesis and evaluate the need to first copy a gene (in the nucleus) and then produce the protein (at the ribosome)
5. Explain the process of transcription, including complementary base pairing of DNA and mRNA nucleotides
6. Explain the process of translation, including interpretation of a mRNA codon chart to determine amino acid sequences
7. Explain how a protein is built from amino acids.
8. Why do proteins determine the physical and physiological traits? (HINT: there are two types of proteins)
9. When do most gene mutations occur?
10. What causes gene mutations?
11. Identify the two major types of gene mutations and examples within each category
12. Why would a mutation in a gamete (sperm or egg) be more dangerous than a mutation in a normal body cell?