**Genetics Study guide**

**Nucleic Acids and Protein Synthesis**

1. What is the function of DNA? Of RNA (all three types)? What type of macromolecule are they?
2. They are both involved in the synthesizing of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. What must be linked together in order for a protein to be made?
3. What does DNA stand for? Explain the structure of DNA.
4. Why is DNA often referred to as the double helix?
5. What are the 3 parts of a nucleotide?
6. Explain complementary base pairing. What are the complementary base pairs within DNA?
7. State three main differences between RNA and DNA.
8. Describe what DNA replication is and why it is needed.
9. List and explain the steps involved in the process of transcription. Where in the cell does this occur? How do the nitrogen bases from DNA pair with RNA?
10. List and explain the steps involved in the process of translation. Where in the cell does this occur? How can you find the amino acids?
11. If a mistake is made in the replication of DNA, transcribing of DNA or translation of DNA, then what will result?
12. What are the different types of mutations?
13. List examples for each type of mutations or show how it would appear.

For numbers 14 -15 convert the following to complete the process of transcription and translation:

14. DNA: TAC C G A A A T C G C G A T C G C G G C G A T T C G G

mRNA:

Codon:

Anticodon:

Amino Acids:

15. DNA: T AC A C G G C C A T C A G G C A A T A C T G G

mRNA:

Codon:

Anitcodon:

Amino Acids:

16. Given the following three mRNA sequences, TWO code for the same protein. Which two? #1. AGU UUA GCA ACG AGA UCA

#2 UCG CUA GCG ACC AGU UCA

#3 AGC CUC GCC ACU CGU AGU

17. Below is the DNA base sequence for the normal protein for normal hemoglobin and the base sequence for (abnormal) sickle cell hemoglobin:



Normal gene: GGG CTT CTT TTT

Sickle gene: GGG CAT CTT TTT

A. Transcribe and translate the normal and sickle cell DNA sequences above.

mRNA codon sequence:

normal:

sickle:

amino acids coded:

normal:

sickle:

B. What kind of a gene mutation is this? Support your answer.