**Study Guide for Unit 5 Test**

Honors Biology, January 27 & 28, 2016

**Unit 5: Molecular Genetics**

**Chapter 8: From DNA to Proteins**

1. **Central Dogma** (the flow of information in a cell)
2. **Structure of RNA** (know the biological macromolecule)
   1. **Nucleotide** (know its 3 parts in RNA)
   2. **Nitrogenous Bases in RNA**
      1. **Complementary Base Pairs** (what nitrogenous bases pair together)
   3. **3 main differences** of RNA from DNA
   4. **3 types** of RNA (& what each type does)
3. **Protein Synthesis**
   1. **Overall Purpose** (Why does everything happen and what does it create?)
   2. **Genotype** vs. **Phenotype** (what they are/differences between the two)
   3. **Transcription**
      1. **Overall Purpose** (**Why** does everything happen?)
      2. **Where** transcription occurs in the cell
      3. **RNA polymerase** (what is its role?)
      4. **Overall Process** (**How** does everything happen?)
   4. **RNA Splicing**
      1. **Overall Purpose** (**Why** does everything happen?)
      2. **Where** RNA splicing occurs
      3. **Introns** vs. **Exons** (what they are/differences between the two)
   5. **Translation**
      1. **Overall Purpose** (**Why** does everything happen?)
      2. **Where** translation occurs in the cell
      3. **Codons**
         1. **Where** they are found
         2. **Purpose** (**Think:** what does a codon specify?)
         3. **Start Codon** (its purpose)
         4. 3 **Stop Codons** (their purpose)
      4. **Anticodons** 
         1. What **type of RNA** it is made of
         2. **Role** in translation
      5. Purpose of the **Codon table** (page 230) & be able to use it
      6. **Overall Process** (**How** does everything happen?)
      7. What does translation start with? What does it end with?
4. **Mutations**
   1. **Mutation** (what it is/ what causes it)
      1. **Point mutations, insertions, and deletions** (different types of mutations)
      2. **When a mutation does / doesn’t change the protein**
      3. **Silent mutation** (what has / hasn’t changed)
      4. **Chromosomal mutations** (gene duplication, translocation, nondisjunction, etc.)
   2. **Mutagen** (definition)

**Chapter 5: Cell Growth and Division**

1. **Stem Cells**
   1. **Gene Expression** (what it is)
   2. **Cell Differentiation** (what it is/what it means when stem cells become differentiated)
   3. **Stem Cells** (what they are/differences between types of stem cells)
   4. **Controversy** (Why are some people concerned with stem cell research?)

**Chapter 9: Frontiers of Biotechnology**

1. **DNA Technology Applications**
   1. **Restriction Enzymes** (how they work)
   2. **PCR** (the purpose of this process/how it works)
   3. **Gel Electrophoresis** (the purpose of this process/how it works – specifically how the DNA moves)
   4. **DNA Fingerprint** (what it is/why all individuals have unique DNA fingerprints)
2. **Cloning** (explain how an entire animal can be cloned)
3. **Genetic Engineering** (define)
   1. **Recombinant DNA Technology** (definition)
   2. **How bacteria plasmids are engineered** (roles of restriction enzymes and ligase)
      1. **Products of this genetic engineering** (examples)
   3. **Genetically Modified Organisms (GMOs)** (what they are/where they are commonly seen)
      1. **Transgenic organisms** (what these are)
   4. **Controversy** (Why are some people concerned with the use of GMOs?)
4. **Human Genome Project** (main goals and current research)
   1. **Genomics** (definition)