**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)