Unit Four Homework Assignment
Chapter Four Genes and Protein Synthesis

The Cell Cycle (3:43 min)
1. What is the cell cycle? How many phases? What type of cells use the cell cycle?
2. What cells in humans do not use the cell cycle?
3. What are the phases of interphase?
4. What occurs in the M phase of the cell cycle?
5. What occurs in G1?
6. What type of cells exit the cell cyce after G1?
7. What happens during the S phase?
8. What is the shortest phase of interphase called?
9. What two events occur during the M phase?
10. What is the result of the cell cycle?

How Mitosis Works (6 min)
1. What is formed after completion of the five phases of mitosis?
2. What is the condition of the DNA in late G2? Called what?
3. What happens to the chromatin in prophase?
4. What creates the cleavage furrow during cytokinesis?
5. When do you experience mitosis in your body?
6. What cell in your body was not produced by mitosis? How was this cell formed?

How Meiosis Works (7:47 min)
1. What type of cells are made by mitosis?
2. What is the purpose of meiosis?
3. What type of cells are made by meiosis?
4. How many chromosomes do somatic cells have?
5. How many chromosomes do sperm and egg cells have?
6. How is meiosis replication described? Why?
7. What is the end product of meiosis interphase?
8. In mitosis the cell goes through the PMAT phase once. In meiosis, how many times will the cell go through the PMAT phase?
9. What is a homologous chromosome?
10. Where does crossing over occur? Why important?
11. What is significant about recombinant chromosomes?
12. How is M1 different in mitosis and meiosis?
13. How many chromatids are there before interphase, after interphase, after meiosis I and after meiosis II?
14. How many unique sperm are formed from a stem cell?

What are telomeres? (1:10 min)
1. Where are telomeres located? Function?
2. What happens with each cell division? Eventual outcome?
3. How may cell prolong their life?

Modern Genetics (6:25 min)
1. What molecule is responsible for transmitting traits?
2. When was the structure or how it works discovered?
3. What is the basic shape and subunits for DNA?
4. What are nucleotides component structures?
5. What form the cross members in the DNA structure?
6. What are genes made from?
7. What is the base paring rule?
8. How are the nitrogen bases held together?

DNA Replication 1 (1:26 min)
1. What is DNA replication?
2. What must happen before this may occur?
3. After the DNA is separated into two, what are these separated strands called?
4. What is the AT CG rule?
5. What is the significance of semi-concervative replication?

DNA Replication 2 (1:26 min)
1. What is the function of DNA helicase?
2. What is the function of DNA polymerase?
3. Why do we need to different mechanisms for coping the DNA template stands?

Addition and Deletion (1:24 min)
1. What determines the sequence of amino acids in a protein?
2. What will happen if you change the sequence of nucleotides in the DNA molecule?
3. What is a frame shift mutation? How dangerous?
4. What is the significance if one nucleotide is deleted in the replication process?

Mutation by Base Substitution (1:06 min)
1. When is a mutation caused?
2. How may this affect the protein?

Gene Expression - Transcription and Translation (1 min)
1. What is a gene? What type of molecule is the end product of this gene?
2. What is the first step called?
3. What is the step to produce the protein called?

Protein Synthesis (5 min)

1. What is the first step in making protein called? What is made?
2. What is the second step in making protein called?
3. What is the difference in nucleotide bases between DNA and RNA?
4. What percent of the DNA molecule codes for protein?
5. How many strands make up DNA? RNA?
6. Where does transcription and translation take place?
7. What is a condon?
8. What are the three types of RNA?
9. What is the reactive part of the transfer RNA called?

Protein Synthesis Animated (19 min)

1. What do genes contain?
2. What are the protein factories? Location?
3. How many amino acids?
4. How many nucleotides are read at a time on the mRNA? Called what?
6. What occurs during the elongation stage of protein synthesis?
7. What is the function of RNA polyerase?
8 What are the exons and introns?
9. How does the mRNA exit the nucleus?

CRISPR - Cas9 (7 min)

1. What does the acronym stand for?
3. What is a palidrome?
4. What is between the palidromes? Are these segments unique? What ae they matched to?
5. What is the functionof the crispr associated genes (CAS-9)? Function?
6. What does this provide for the bacteria?
7. What do the spacers represent?
8. How is this natural phenomena going to be used in humans?
9. What is the trcrRNA(tracer)-crRNA(the guide portion) chimera?
10. What is the third step?