Name: _____ Date: _____ Period: _____ Assign#: _____

Unit 4 Test Review Sheet

12-1: Deoxyribonucleic Acid

1. What type of macromolecule is DNA? _____
2. What are the building blocks on DNA called? _____ What are the three parts of those building blocks? _____, _____ and _____
3. The structure of DNA was discovered by _____ and _____ in the year _____. The discovery would have been nearly impossible without the help of _____ and _____ who provided x-ray crystallography pictures of DNA.
4. What are Chargaff's rules? _____
5. Using Chargaff's rules determine the approximate percentage of thymine, adenine and guanine in a DNA molecule if 28% of the nucleotides contain cytosine. a. Thymine: _____ b. Adenine: _____ c. Guanine: _____
6. What is base pairing? _____
7. How are the bases in DNA held together? _____
8. How is the sugar phosphate backbone held together? _____

12-2: Chromosomes and DNA Replication

1. Where is DNA found in prokaryotic cells? _____ Eukaryotic cells? _____
2. DNA wraps around proteins called _____ to form a substance called _____. At the beginning of cell division, the DNA and proteins pack together even tighter to form individual structures called _____
3. DNA copies itself during a process called _____, which occurs during the _____ phase during _____ of the cell cycle.
4. Describe the steps of DNA replication:
   a. The two strands of DNA are _____ by _____.
   b. _____ then adds new complementary bases to each strand of DNA. This process is said to be _____because one half of the original DNA double helix is conserved in each of the new strands. The enzyme _____ then glues the phosphate and sugar together on the lagging strand.
5. A gene is _____

12-3: RNA and Protein Synthesis

1. How are DNA and RNA different?
   a. _____
   b. _____
   c. _____
2. What are the different types of RNA and what is their function:

Type of RNA		Function
Abbreviation	**Full Name**	

3. Copying part of a sequence of DNA into a complementary strand of RNA is called: _____. During this process the enzyme that binds to DNA and adds complementary bases to make RNA is called _____. Where does this process take place in the cell? _____
4. What kind of macromolecule is DNA polymerase? _____ More specifically it is a catalyst in living things so it is called a(n) _____.

5. Before mRNA leaves the nucleus, segments called _____ are cut out in a process called _____. After this process only the _____are left, which make up _____ that is ready to travel into the cytoplasm.
6. A group of 3 nucleotides that code for a specific amino acid is called a _____.
7. The universal start codon is _____ which codes for the amino acid _____.
8. The 3 stop codons are _____, _____, and _____. What amino acids do these stop codons code for? _____
9. What amino acid will be coded for by each of the following mRNA codons:
   a. UCA _____ b. CAC _____ c. AUU _____
10. Which codons code for the amino acid Isoleucine? _____
11. During _____ the information carried by the mRNA is used to produce a protein.
12. The monomer of a protein is a(n): _____.
13. A polypeptide chain is a _____. It is sometimes called a polypeptide chain because the nucleotides are held together by _____bonds. A chain of amino acids is called a _____
14. Where does translation take place in the cell? _____
15. The three bases on a tRNA molecule that match up with the codon on mRNA are called _____
16. What is the amino acid sequence that is coded for by the following DNA sequence of a gene (begin with the start codon)?
    a. DNA: G C T A C T A T A C G C C G C T A T G C C C A A T C
    b. RNA: _____
    c. Amino Acid Sequence: _____
17. What does protein synthesis mean? _____
18. _____ is the genetic material found in each cell in your body. One segment of this molecule is called a _____. Every gene expresses itself as a _____. Many proteins put together make up all of your _____.

12-4: Mutations

1. A mutation is _____
2. Point mutations where one nucleotide replaces another are called _____.
3. Mutations that shift the reading frames (codons) are called: _____mutations.
4. Inserting a nucleotide into a sequence would cause a _____ mutation.
5. Deleting a nucleotide from a codon would cause a _____mutation.
6. Compare the following two sequences of DNA to determine what type of mutation has occurred:
   a. Original DNA: GCACCGAGA
   b. Mutant DNA: GCACACGAG
   c. Circle the mutant DNA where it is different from the Original. What kind of mutations has occurred? _____
   d. How do you know? _____
7. A change in the location of or number of genes on a chromosome is called a _____
8. Will a point mutation always affect the amino acid sequence of a protein? ___Explain _____

12-5: Gene Regulation

1. What is an operon? _____
2. How does a repressor protein work? _____
3. What does the TATA box do? _____
4. What is the importance of the HOX gene? _____