**DNA & Protein Synthesis Study Guide**

1. Describe the base pairing rules in a DNA molecule
2. The backbone of a DNA molecule is made of which two components?
3. Who discovered that DNA was the shape of a double helix?
4. Define the following terms:
	1. Deletion
	2. Nondisjunction
	3. Translocation
	4. Inversion
5. Describe the process of DNA replication (include terms such as helicase, polymerase, single stranded binding proteins, okazaki fragments, ligase, leading strand, lagging strand).
6. Describe the function of messenger RNA, transfer RNA, and ribosomal RNA.
7. What is the subunits of DNA & RNA?
8. In which part of the cell does this process shown in Figure 11-1 take place?
9. Which of the structures in Figure 11-1 are composed of RNA?
10. Structure III in Figure 11-1 represents a(n) \_\_\_\_\_.
11. The process illustrated in Figure 11-1 is called \_\_\_\_\_.
12. A DNA segment is changed from-AATTAG- to -AAATAG-. This is a \_\_\_\_.
13. A DNA segment is changed from -AATTAGAAATAG- to -ATTAGAAATAG-. This is a \_\_\_\_.
14. The process of converting RNA code into an amino acid sequence is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
15. The molecule \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ brings amino acids to the ribosomes for the assembly of proteins.
16. Each set of three nitrogen bases representing an amino acid is referred to as a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
17. Thymine, adenine, guanine, and cytosine are classified as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
18. During the process of transcription, DNA serves as the template for making \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which leaves the nucleus and travels to the ribosomes.
19. When parts of chromosomes are broken off and lost during mitosis or meiosis, the result is a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
20. If a nucleotide is added or removed from a DNA molecule and mRNA is created, the codons after the mutation will not be read correctly. This is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
21. A change in a single base pair of the DNA molecule that affects the synthesis of an entire protein is called a(n) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
22. Why is tRNA important in translation?
23. In Figure 11-2, use the letter P to label all of the phosphate groups. Use an S to label all the sugar molecules. For labeling the nitrogen bases, use a T for thymine and a C for cytosine. Guanine and adenine have been filled in for you. Circle and label a codon. Circle and label a nucleotide.

**Figure 11-2**