**PROTEIN SYNTHESIS AND MUTATIONS TEST REVIEW**

1. Fill out the chart below to compare DNA to RNA.

|  |  |  |
| --- | --- | --- |
|  | **DNA** | **RNA** |
| Full Name |  |  |
| Type of Macromolecule |  |  |
| Single or Double Stranded |  |  |
| Name of Monomer |  |  |
| Does the monomer contain a phosphate group? |  |  |
| Does the monomer contain a nitrogenous base? |  |  |
| Type of sugar found in it |  |  |
| Four nitrogenous bases it contains |  |  |
| Can it leave the nucleus? |  |  |
| Is it in involved in transcription? |  |  |
| Is it in involved in translation? |  |  |
| Is it involved in replication? |  |  |
| Disposable or permanent copy? |  |  |

1. Insert a picture of a DNA monomer. What is it called? Label all of the parts.
2. Insert a picture of an RNA monomer. What is it called? Label all of the parts.
3. What is the role of DNA in protein synthesis?
4. What are the steps for protein synthesis (gene expression)?
5. How many strands of DNA serve as a template during transcription?
6. Where in the cell does transcription take place?
7. What are the three kinds of RNA? Insert a picture of each, and define their function.
8. What are the steps of transcription?
9. What are the substances that initiate (start) and stop the transcription process?
10. Assemble an mRNA molecule based on the following DNA strand:
    * 1. DNA: AGTACCGTACGA
      2. mRNA: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. What happens to the mRNA molecule before it leaves the nucleus for translation?
12. What are introns and exons?
13. Identify the introns and exons:

mRNA molecule: ACCUGGAAUGCA

code for protein : ACCAAU

introns : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ exons : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Where in the cell does translation takes place?
2. What types of RNA are involved in translation?
3. Describe the process of translation.
4. If mRNA codon is UUC, then a tRNA anticodon will be\_\_\_\_\_\_\_\_\_.
5. How do you read the codon wheel? Describe in detail.
6. How do you read the codon chart? Describe in detail.
7. Why do multiple codons code for the same amino acid?
8. Use the DNA sequence to determine the mRNA sequence and the amino acid sequence that determines the expression of a gene. *Use the chart to code for the amino acids.*

DNA: CCCTGATGCTTG

mRNA:

amino acid sequence:

1. What is the end result of translation?
2. What is a protein?
3. What is the monomer of a protein?
4. What is the name of the bond that joins together a protein?
5. What is a mutation?
6. Define the following gene mutations:
7. Substitutions-
8. Insertions-
9. Deletions-
10. What type of mutations lead to frameshift mutations?
11. Are all mutations harmful? Explain your answer. (Think about the types of substitution mutations)