Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**DNA & Protein Synthesis Study Guide**

**Part I: DNA Structure**

1. What is the monomer of DNA?

2. Draw a picture of a monomer of DNA and label the following: **Nitrogen Base, Phosphate, & Sugar (Deoxyribose)**

3. What is the shape of DNA?

4. In the DNA diagram below, what parts form the rungs of the ladder?

 What parts form the sides of the ladder?

 Fill in the missing bases.

**Part II: DNA Replication**

|  |  |
| --- | --- |
| 5. **What is DNA replication?** |  |
| 6. **When does DNA replicate?** |  |
| 7. **Why does DNA replicate?** |  |
| 8. **Describe how DNA replicates.****(List the steps in order)** |  |

**Part III: RNA**

9. Use the T-chart below to give at least 3 differences between DNA and RNA.

|  |  |
| --- | --- |
| **DNA** | **RNA** |
|  |  |

|  |  |
| --- | --- |
| **Molecule** | **Function/Job** |
| 10. mRNA |  |
| 11. tRNA |  |

**Part IV: Protein Synthesis**

|  |  |  |
| --- | --- | --- |
| **Stage** | **Location** | **What Happens? (1 sentence or phrase)** |
| **Transcription** | 12. | 13. |
| **Translation** | 14. | 15. |

16. Below is a piece of DNA. Transcribe it into mRNA, then use your codon box to translate it into a chain of amino acids.

 **DNA—** TAC GGA CAA GTA TTA AAA ACT

 **mRNA—**

 **Amino Acids—**

17. Why do you need to have/make proteins? Give at least 2 reasons.

**Part V: Mutations**

18. What is a mutation?

19. Are mutations always bad? Explain your answer.

20. What is a mutagen? Give at least 3 examples of mutagens.

|  |  |  |
| --- | --- | --- |
|  | **Point Mutation** | **Frame Shift Mutation** |
| 21. Describe in your own words. |  |  |
| 22. Example: |  |  |
| 23. Which type of mutation is usually more harmful? Why? |

**Part VI: Recombinant DNA, Transgenic Organisms, & Genetic Engineering**

24. What is recombinant DNA? How does it help plants?

25. What is a transgenic organism? How do they help us? How do they harm us?

26. What is a GMO? Describe some advantages and disadvantages of using them.