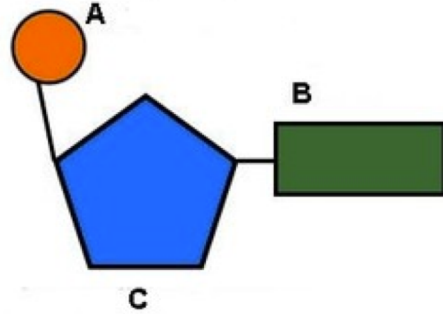


Name: _____

Period: _____

DNA & Protein Synthesis Study Guide

1. List the three parts of a nucleotide and label the diagram to the right.



2. List the four nucleotide bases.

3. How do the nucleotides pair up?

_____ pairs with _____.

_____ pairs with _____.

4. What is the shape of a DNA molecule?

5. What is the base-pair rule?

6. Based on the base-pair rule, if a DNA strand fragment is 15% adenine, what are the percentages of Thymine, Cytosine, and Guanine in the DNA strand fragment?

Thymine is _____%

Cytosine is _____%

Guanine is _____%

7. If a DNA strand fragment is 38% adenine, what are the percentages of Thymine, Cytosine, and Guanine in the DNA strand fragment?

Thymine is _____%

Cytosine is _____%

Guanine is _____%

For questions 8 through 10, complete the DNA strand fragments and the questions that follow.

8. Specimen A: Original Strand: ATACTCGACCATACCTAA
Complimentary Strand:

9. Specimen B: Original Strand: ATACTCGACCAGGATCAA
Complimentary Strand:

10. Specimen C: Original Strand: ATACTCGACCAGGATAAA
Complimentary Strand:

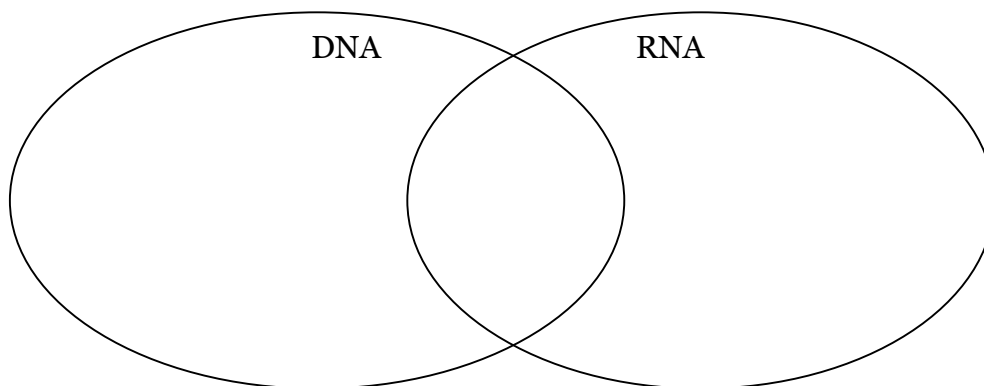
11. What two specimens are the most genetically similar? What percentage are they genetically similar? Show your work?

12. Which of the three specimens is the least genetically similar? What percentage is it genetically similar to the other two specimens? Show your work.

13. Humans are 50 percent genetically similar to bananas. What does this mean?

14. The human genome is 3 billion (3,000,000, 000) base pairs long. How many of these base pairs are in the same sequence as a banana's? Show your work.

15. Compare (find similarities) and contrast (find differences) DNA and RNA.



16. List the three main types of RNA and their functions.

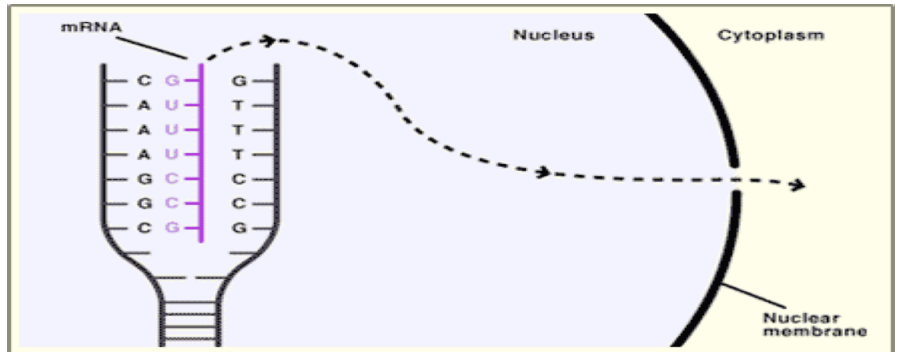
- a.
- b.
- c.

17. A section of one DNA strand has the sequence ACCGAGGTT. What is the sequence of an mRNA transcribed from this section of DNA?

- a. ACCGAGGUU b. ACCGAGGTT c. TGGCTCAA d. UGGCUCAA

18. What process is shown in the diagram to the right?

- a. replication
b. transcription
c. translation
d. protein synthesis



19. Describe the differences between transcription and translation.

Use the given chart showing the genetic code and its corresponding codons and amino acids to help answer the questions that follow.

20. The mRNA codon of CCG codes for what amino acid?

- a. Leucine
b. Proline
c. Arginine
d. Glycine

	U	C	A	G	
U	Phenylalanine Phenylalanine Leucine Leucine	Serine Serine Serine Serine	Tyrosine Tyrosine <i>Stop</i> <i>Stop</i>	Cysteine Cysteine <i>Stop</i> Tryptophan	U C A G
C	Leucine Leucine Leucine Leucine	Proline Proline Proline Proline	Histidine Histidine Glutamine Glutamine	Arginine Arginine Arginine Arginine	U C A G
A	Isoleucine Isoleucine Isoleucine Methionine	Threonine Threonine Threonine Threonine	Asparagine Asparagine Lysine Lysine	Serine Serine Arginine Arginine	U C A G
G	Valine Valine Valine Valine	Alanine Alanine Alanine Alanine	Aspartic acid Aspartic acid Glutamic acid Glutamic acid	Glycine Glycine Glycine Glycine	U C A G

21. Given the following DNA strand: **TACGTATGCCGTATGGGCATT**

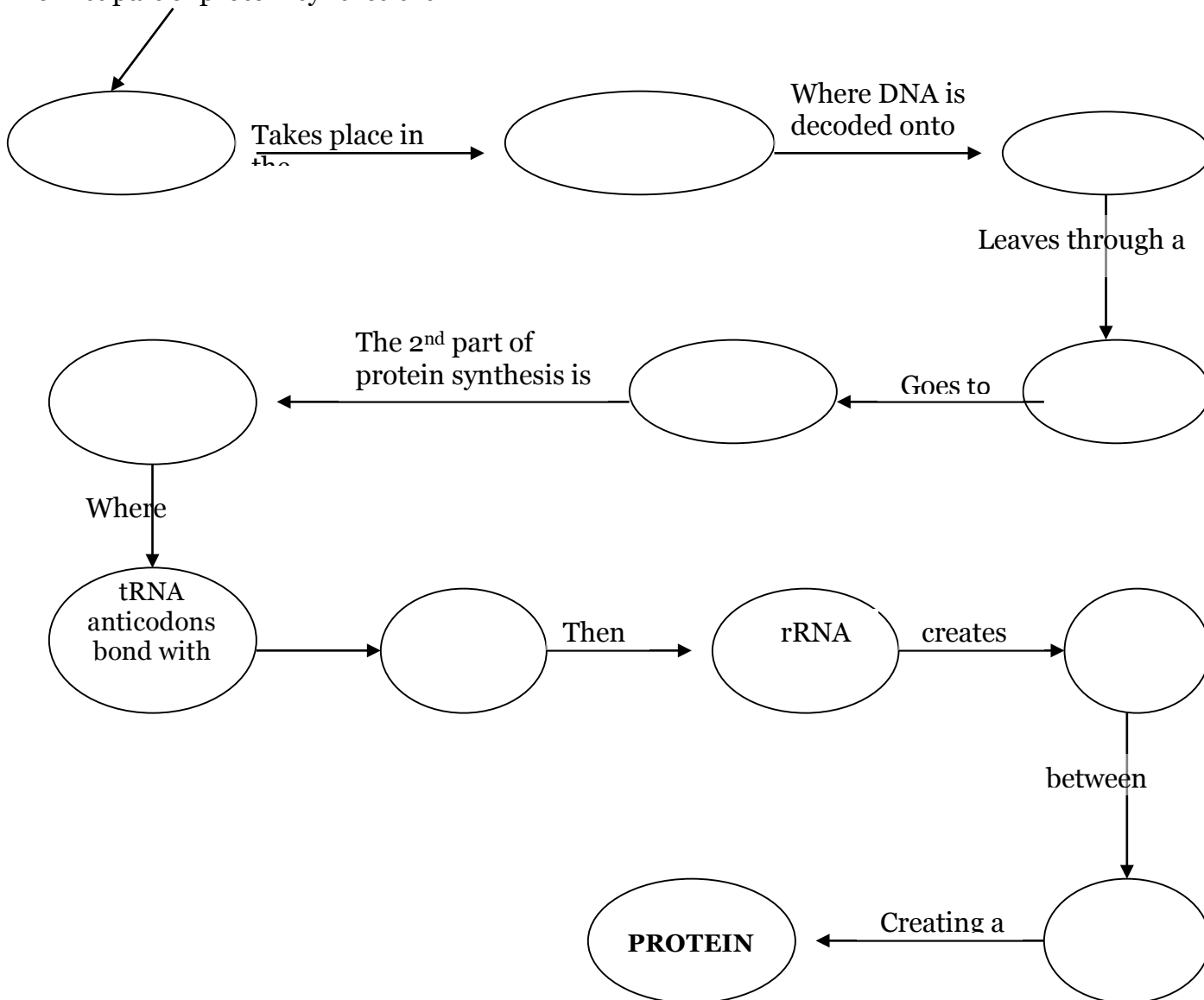
a. What is the DNA corresponding to given strand?

b. What is the mRNA corresponding to the given strand?

c. What is the correct amino acid sequence to the mRNA strand given in part b (use the table from the previous page)?

22. Fill in the flow chart below, using the following words: **Amino acids, mRNA, mRNA codon, nucleus, nuclear pore, peptide bonds, ribosome, transcription.**

The first part of protein synthesis is



23. What is a mutation, and what are the three types of mutations discussed in the lesson?

24. Which three genetic disorders are caused by mutations?

25. Below is a string of nucleotides. With the string of nucleotides, you are going to create mutations to show how the sequence of DNA would be altered.

Nucleotide sequence: A G G C G T C C A T G A

Make 3 point mutations-insertion, deletion, substitution

Insertion:

Deletion:

Substitution:

