Study Guide - DNA, RNA, protein, Viruses Name _____

Please use this study guide as you prepare for the test, it will be very helpful to you. If you need help on this chapter, please let me know. I am available after school most days, and before school at 7:10 each morning, unless I have a meeting. Please schedule a time with me during class hours so that I know to expect you.

1. DNA is made up of subunits called _____. The primary function of DNA is to store and transmit your

_____.

2. What are the three parts of a nucleotide?

a)_____ b)_____

c)_____

d) DNA stands for _____.

3. What type of bond forms between the nitrogen base pairs? _____

4. Fill in this chart to show how DNA differs from RNA.

DNA	RNA
a) sugar: _____	sugar: _____
b) Bases: adenine, guanine, cytosine and _____	e) Bases: adenine, guanine, cytosine, and _____
adenine pairs with thymine c) guanine pairs with _____	f) adenine pairs with _____ g) guanine pairs with _____
d) _____stranded	h) _____stranded
stays inside the nucleus	i) _____the nucleus

Important note: compare the differences!

5. **DNA Replication:**

a) Purpose: To go from one _____ strand to two identical _____ strands.

b) Replication starts using the enzyme _____ which straightens out the double helix and opens the strand.

c) Replication continues when the enzyme DNA _____ brings in nucleotides that are complementary to the opened DNA side.

d) The enzyme helicase breaks the DNA strand where two _____

are joined, specifically at the _____ bond between them.
Replication ends with two identical DNA strands.

6. If the strands are NOT identical, this is a problem! If copied incorrectly, this could lead to:

a) _____ a disease of uncontrolled cell growth

b) _____ general term for a change in the DNA pattern

c) incorrect _____ synthesis- when sequences of amino acids are incorrect because the DNA code is wrong.

7. What is a gene? A gene is an instruction for a trait denoted by a sequence of _____

contained on one of your 46 _____, which are contained inside the

_____ of the cell. *Important Note: Your DNA pattern gives you your traits!*

8. What are the three forms of RNA?

i) _____ (a strand of RNA made by using DNA as a pattern- it carries the genetic code to the ribosome where it is translated into a sequence of amino acids)

ii) _____ (ribosomes are made of this type of RNA plus proteins)

iii) _____ (brings an amino acid to the ribosome)

KNOW THE FUNCTION OF EACH TYPE OF RNA!

9. **Transcription:** A strand of _____ is used to make _____.

This occurs in the _____ of the cell. The strand of mRNA leaves the

_____ and aligns itself with a _____ (cell part that makes proteins).

10a. **Translation:** During translation, a strand of _____is translated into

_____ at this cell part: _____ & the _____ brings the amino acid.

10 b. Summarize the flow of genetic information:

From: __ __ __ to __ __ __ __ to __ __ __ __ to _____ _____.

11. A group of **3** nucleotides in mRNA that specifies an amino acid is called a

_____. This is read at the ribosome.

12. One side of the tRNA molecule has an _____ (set of three

nucleotides opposite to mRNA) and the other side has an _____ that you got from the proteins you ate and broke down.

13. What happens when the tRNA anticodon attaches to the codon on mRNA? (That is, what is released, and where does it attach?)

14. Consider this sequence of nucleotides in a strand of DNA: **CTA GCG TAG TTA**
What is the complementary strand of DNA?

15. Consider this sequence of nucleotides in a **sense strand (or coding strand)** of DNA:
CTA GCG TAG TTA

a) What sequence of mRNA will be made from it?

b) Using the mRNA chart in your textbook or packet, what amino acids will be arranged by the ribosome?

c) If you had the anticodon GGU, what amino acid would be brought to the ribosome?
*Remember, you must first convert it to mRNA language (a codon) before you look up the amino acid since the chart in your text is a **messenger** RNA chart!*

Be prepared to do many examples like this one!

16. You have a polypeptide sequence of two amino acids: aspartic acid and glutamic acid. Give a valid DNA sequence that could have produced these two amino acids. There are several answers to this question.

Hint: look up aspartic acid & glutamic acid in the mRNA chart, get the mRNA code, turn it into DNA code.

17. What is transformation?

18. Briefly describe the following three types of DNA mutations:
    a. nonsense

    b. missense

    c. silent

19. *You are responsible for everything discussed in class. Also, you are responsible for knowing the answers to homework questions.*

20. Don't confuse TRANSformation TRANScription and TRANSlation. They sound the same, but are very different processes.