

NAME: _____

Unit 9 Study Guide – DNA – Replication, Transcription, and Translation

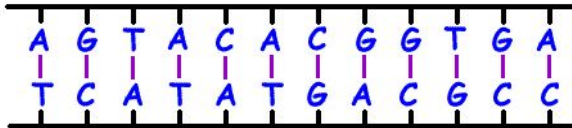
The genetic code of a cell is carried in its _____, which is located in the _____ of the cell. The DNA molecule has four nitrogenous bases, A (_____), T (_____), G (_____), and C (_____). These bases pair along the inside of the ‘double _____’ of the DNA molecule. The base Adenine always pairs with _____, and guanine always pairs with _____. The outside backbone of the double-stranded molecule is made up of deoxyribose _____ molecules and _____ groups.

DNA is copied by a process known as _____. The process is semi-conservative, which means that in each new DNA molecule, there will be one old strand of DNA and one _____ strand.

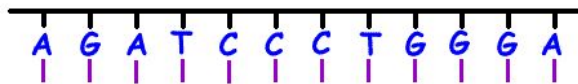
Since protein production takes place in the _____, which are located in the cytoplasm, the genetic code must be exported there before protein synthesis can occur. This is done in the form of _____ RNA, also called mRNA. mRNA is made from the DNA template in a process called _____. There are several differences between RNA and DNA:

- RNA is _____-stranded
- RNA contains the sugar _____ (instead of deoxyribose in DNA)
- RNA contains the base U (_____) instead of the base Thymine

The ribosomes read _____ bases of mRNA at a time which are called _____, and each ‘translates’ to a particular amino acid. Molecules of _____ RNA (tRNA) bring amino acids that build the protein chain. The process begins with a ‘start’ codon (AUG) which puts the amino acid _____ in place and continues until the ribosome reaches a ‘_____’ codon, at which point the process terminates (ends).



- How many base pairing errors are depicted in the image above? _____ (circle them)
- The double-stranded DNA molecule has a three dimensional structure known as a:
 - Matrix
 - Triple helix
 - Double helix
 - Spiral



- Which of the following bottom strands of DNA is complementary to the strand shown above?

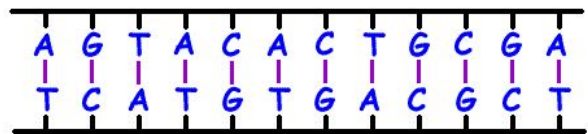
- T C T A G G G A C C C T
- A C T A G G T A C T C T
- A G T A G G T A C T C G
- C G T A A G A A C G C G

4. In DNA, a nucleotide is made of: (circle all that apply)
- A nitrogen base such as adenine, thymine, guanine or cytosine
 - Proteins
 - A deoxyribose sugar
 - Amino acids
 - A phosphate group
 - Starches

5. Which pairings correctly depict the way in which DNA bases pair?
- Adenine pairs with adenine | thymine pairs with thymine
 - Adenine pairs with thymine | guanine pairs with cytosine
 - Adenine pairs with guanine | thymine pairs with cytosine
 - Adenine pairs with cytosine | thymine pairs with guanine

6. In which organelle can most of the DNA be found in eukaryotic cells?
- The ribosomes
 - The mitochondria
 - The golgi apparatus
 - The nucleus

7. What part of the structure of DNA do the bold black lines on the top and bottom of this image depict?

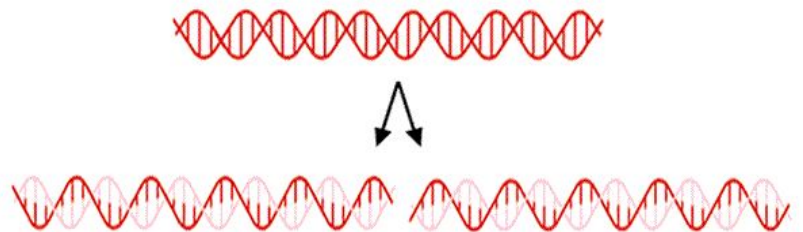


8. In DNA, the total number of guanine bases will be equal to the total number of:

- Guanine bases
- Thymine bases
- Cytosine bases
- Deoxyribose sugars

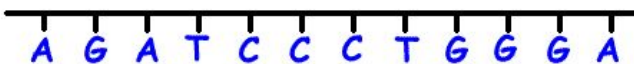
9. As shown in the image, in DNA replication prior to cell division, the new DNA molecules that result each contain:

- An ice cream sundae with a cherry on top
- One old strand of DNA and one new strand of DNA
- Two news strands of DNA
- Two old strands of DNA



10. In DNA, the total number of adenine bases will be equal to the total number of:

- Phosphates
- Thymine bases
- Guanine bases
- Cytosine bases



11. Which of the following represents an RNA strand that would be transcribed from the DNA strand?

- U C U A G G G A C C C U
- T C T A G G G A C C C T
- T C T U G G G U C C C T
- T C T A U U U A C C C T

12. In RNA, the base adenine is paired with _____ instead of _____, as it is in DNA
13. The process by which RNA is made from a template of DNA is known as:
14. Which of the following is NOT a difference between DNA and RNA?
- RNA leaves the nucleus; DNA does not
 - They contain different sugars
 - DNA has a sugar-phosphate backbone; RNA does not
 - DNA is double-stranded; RNA is single-stranded
15. The function of mRNA is to:
- Protect the nucleus from damage by enzymes
 - Backup the genetic information in case the DNA is destroyed
 - Control cell division
 - Serve as a template for making proteins
16. RNA is made from a DNA template:
- In the labs of mad scientists
 - In the cytoplasm
 - In the nucleus
 - In the ribosomes



17. What is the amino acid sequence resulting from this section of mRNA?
- Phe – His – Arg – Gly
 - Ser – Gln – Gly – Ser
 - Ser – Arg – Asp – Pro
 - Val – Pro – Tyr – Leu
18. The mRNA base sequence AUG serves as the ‘start codon’ for protein synthesis. This codon codes for the amino acid:
- Tyr
 - Met
 - Try
 - Cys
19. Which of the following codons is not a codon for the termination (STOP) of translation?
- UGG
 - UGA
 - UAG
 - UAA
20. A mutation in DNA coding for a protein results in a change in an mRNA codon from ACA to AAC. This change results in:
- Premature stop codon
 - No change
 - Failure to stop translation
 - Insertion of the wrong amino acid
21. The process of translation takes place when the mRNA is attached to:
- A ribosome
 - The endoplasmic reticulum
 - A mitochondria
 - The nucleus
22. A 12-base section of mRNA composed of nothing but the base cytosine would code for the repeated addition of the amino acid:
- Iso
 - His
 - Pro
 - Phe
23. A mutation in DNA coding for a protein results in a change in an mRNA codon from UAA to UAG. This change results in:
- Early stop to translation
 - No change
 - Failure to stop translation
 - Insertion of the wrong amino acid

