

Protein Synthesis Review

Chapter 8

Question 1

- The idea that information flows in one direction is called _____. It was introduced by Francis Crick

Answer 1

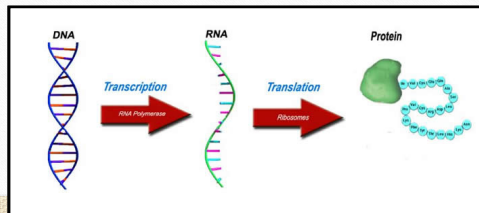
- Central Dogma

Question 2

- Describe the three processes involved in the central dogma. They must be in the correct order.

Answer 2

1. Replication of DNA
2. Transcription of DNA into RNA
3. Translation of RNA into protein

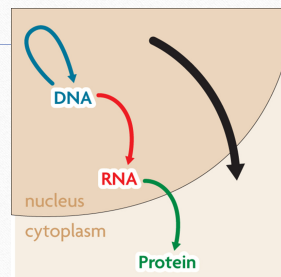


Question 3

- A. What two processes in the central dogma concept occur inside the nucleus?
- B. Which one occurs in the cytoplasm?

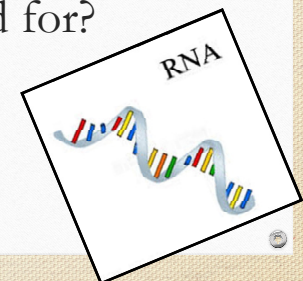
Answer 3

- A. Replication and Transcription
- B. Translation



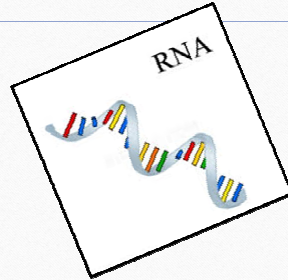
Question 4

- What does RNA stand for?



Answer 4

- Ribonucleic Acid

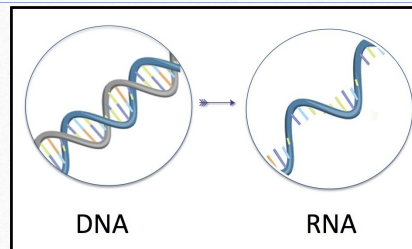


Question 5

- What is the name of the process that uses one strand of DNA to make a strand of mRNA?

Answer 5

Transcription



Question 6

- Identify three major differences between DNA and RNA.

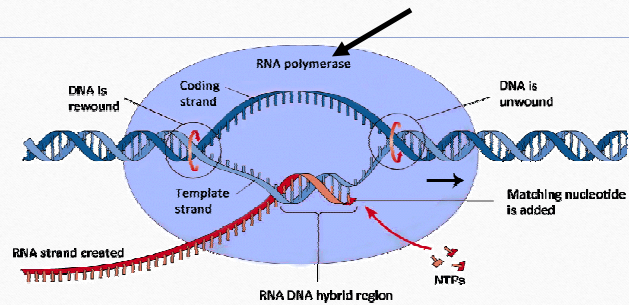
Answer 6

	DNA	RNA
Type of Sugar	Deoxyribose	ribose
Number of Strands	Double stranded (double helix)	Single stranded (single helix)
Nitrogenous Bases	Adenine, Cytosine, Guanine and Thymine	Adenine, Cytosine, Guanine and Uracil
Location in Cell	Nucleus	Nucleus & Cytoplasm

Question 7

- Identify the enzymes that does all the work during transcription.

Answer 7

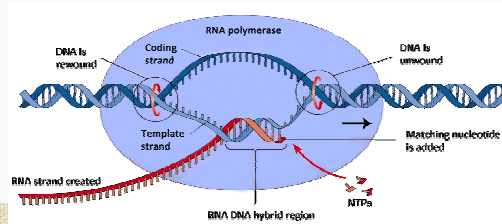


Question 8

- What are the two functions of RNA Polymerase during transcription?

Answer 8

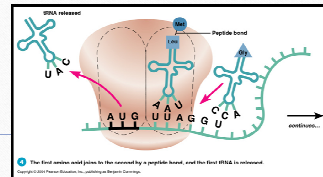
- It unwinds the DNA
- It bonds free-floating nucleotides to the DNA template



Question 9

1. What are the 3 types of RNA?
2. What are their functions?

Answer 9



1. **Messenger RNA (mRNA)**: carries a message that will be translated to form a protein (made from DNA during transcription)
2. **Ribosomal RNA (rRNA)**: forms part of ribosomes where proteins are made
3. **Transfer RNA (tRNA)**: carries amino acids from the cytoplasm to ribosomes to make proteins

Question 10

- What is the complimentary mRNA strand made from this DNA sequence?
- DNA Sequence: A C C T A G G T T A A C

Answer 10

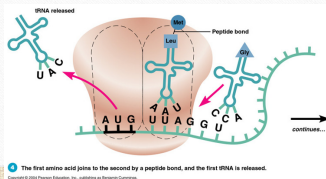
- DNA Sequence: A C C T A G G T T A A C
- mRNA Sequence: U G G A U C C A A U U G

Question 11

- Explain the process of Translation.

Answer 11

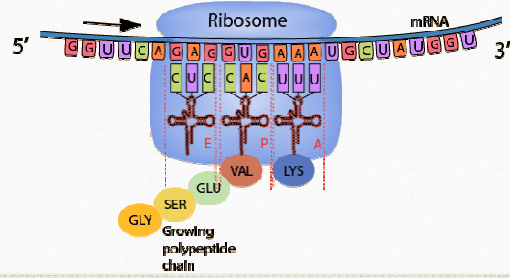
- Translation is the process where **mRNA** is translated into a **protein**.



Question 12

- Where in the cell does translation occur?
I need the specific location..

Answer 12



Question 13

- During translation, what is brought to the ribosome and used to create proteins?

Answer 13

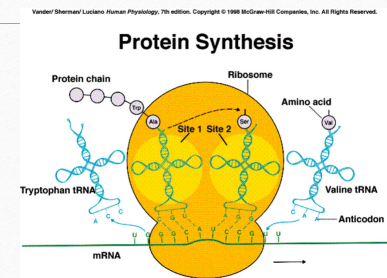
- Amino Acids

How many amino acids are there? 20

		Second letter					
		U	C	A	G		
First letter	U	UUU Phe UUC UUA Leu UUG	UCU Ser UCC UCA UCG	UAU Tyr UAC UAA Stop UAG Stop	UGU Cys UGC UGA Stop UGG Trp	U C A G	
	C	CUU Leu CUC CUA CUG	CCU Pro CCC CCA CCG	CAU His CAC CAA CAG	CGU Arg CGC CGA CGG	U C A G	
	A	AUU Ile AUC AUA AUG Met	ACU Thr ACC ACA ACG	AAU Asn AAC AAA AAG	AGU Ser AGC AGA AGG	U C A G	
	G	GUU Val GUC GUA GUG	GCU Ala GCC GCA GCG	GAU Asp GAC GAA GAG	GGU Gly GGC GGA GGG	U C A G	

Question 14

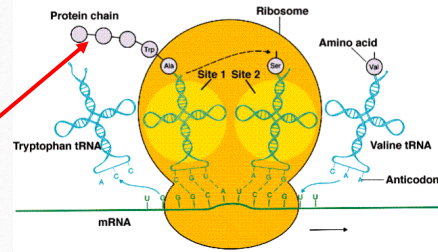
- What kind of bonds link amino acids to create proteins?



Answer 14

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Protein Synthesis



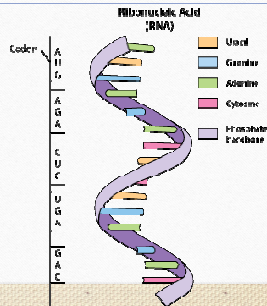
- Peptide Bonds

Question 15

- What are codons made of?

Answer 15

- 3 nucleotides



Question 16

- Create the protein chain for the following mRNA strand.
- mRNA Sequence: U G G A U C C A A U U G

First Position (5' end)	Second Position				Third Position (3' end)
	U	C	A	G	
U	UUU] Phe UUC] UUA] UUG] Leu	UCU] Ser UCC] UCA] UCG]	UAU] Tyr UAC] UAA] Stop UAG] Stop	UGU] Cys UGC] UGA] Stop UGG] Trp	U C A G
C	CUU] Leu CUC] CUA] CUG]	CCU] Pro CCC] CCA] CCG]	CAU] His CAC] CAA] Gln CAG]	CGU] Arg CGC] CGA] CGG]	C U C A G
A	AUU] Ile AUC] AUA] Met AUG]	ACU] Thr ACC] ACA] ACG]	AAU] Asn AAC] AAA] Lys AAG]	AGU] Ser AGC] AGA] Arg AGG]	A U C A G
G	GUU] Val GUC] GUA] GUG]	GCU] Ala GCC] GCA] GCG]	GAU] Asp GAC] GAA] Glu GAG]	GGU] Gly GGC] GGA] GGG]	G U C A G

Answer 16

- mRNA Sequence: U G G A U C C A A U U G

Protein chain: Trp - Ile - Gln - Leu

How many codon are in the above mRNA Sequence?

4

How many amino are used to make the protein using the above mRNA Sequence?

4

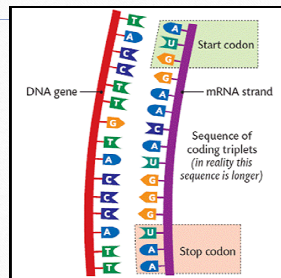
		Second Position				
		U	C	A	G	
U	UUU	Phe	UCU	Ser	UGU	Cys
	UUC	Phe	UCC	Ser	UGC	Cys
	UUA	Leu	UCA	Stop	UGA	Stop
	UUG	Leu	UCG	Stop	UGG	Trp
C	CUU	Leu	CCU	Pro	CAU	His
	CUC	Leu	CCG	Pro	CAC	His
	CUA	Leu	CCA	Gln	CAA	Gln
	CUG	Leu	CCG	Gln	CAG	Gln
A	AUU	Ile	ACU	Thr	AUU	Asn
	AUC	Ile	ACC	Thr	AAC	Asn
	AUA	Met	ACA	Lys	AUA	Arg
	AUG	Met	ACG	Lys	AAG	Arg
G	GUU	Val	GCU	Ala	GAU	Asp
	GUC	Val	GCC	Ala	GAC	Asp
	GUA	Val	GCA	Ala	GAA	Glu
	GUG	Val	GCG	Ala	GAG	Glu

Question 17

- In order for the process of translation to being, what kind of codon is necessary?

Answer 17

- Start Codon
- AUG-met



Question 18

- Three bases on tRNA which match one mRNA codon is called _____.

