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DNA PROCESSES:

There are three DNA processes vital for life.

DNA Replication:

_____ makes a _____ of _____ with the help of _____.

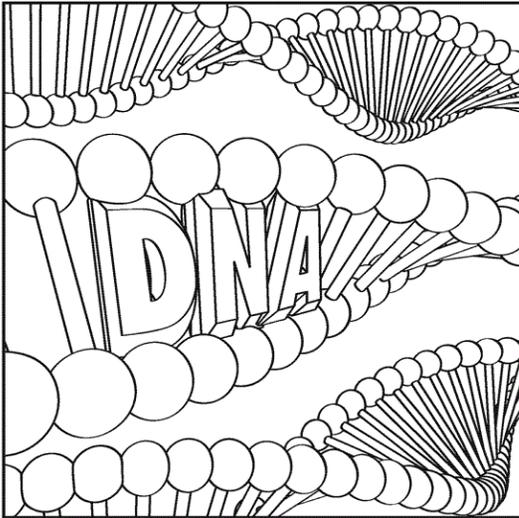
DNA Transcription:

_____ is _____ into _____ with the help of _____.

DNA Translation:

The _____ is translated into _____ which become a _____ chain to be folded into a _____.

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IMPORTANT VOCABULARY TERMS

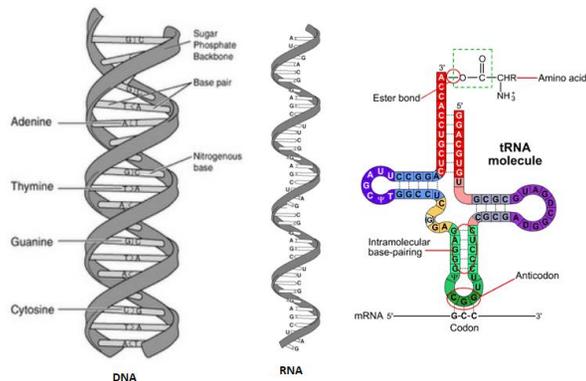
DNA: sequence of DNA _____ which carry _____ information.

RNA: sequence of RNA _____ transcribed from _____.

mRNA: _____ RNA, _____ the _____ information from _____ to the _____.

tRNA: _____ RNA, molecule which _____ the appropriate _____ over to the _____.

rRNA: _____ RNA, which is found embedded in the _____.



PRACTICE:

Template DNA: TAC CTG TTA ACT

mRNA: **AUG** _____

anticodon: **UAC** _____

amino acids: **met** _____

(Use the mRNA to find the amino acids, not the anticodon!)

Template DNA: TAC AAA TGC CAA TCA GCA ATC

mRNA: **AUG** _____

anticodon: **UAC** _____

amino acids: **met** _____

(Use the mRNA to find the amino acids, not the anticodon!)

Template DNA: TAC GTT CAT ATG CCA TTT GCG CGC ATT

mRNA: _____

anticodon: _____

amino acids: _____

(Use the mRNA to find the amino acids, not the anticodon!)

DNA TRANSLATION: CODONS

In order to determine which amino acids a mRNA sequence becomes you need to use a codon chart.

First Letter	Second Letter				Third Letter
	U	C	A	G	
U	phenylalanine	serine	tyrosine	cysteine	U
	phenylalanine	serine	tyrosine	cysteine	C
	leucine	serine	stop	stop	A
	leucine	serine	stop	tryptophan	G
C	leucine	proline	histidine	arginine	U
	leucine	proline	histidine	arginine	C
	leucine	proline	glutamine	arginine	A
	leucine	proline	glutamine	arginine	G
A	isoleucine	threonine	asparagine	serine	U
	isoleucine	threonine	asparagine	serine	C
	isoleucine	threonine	lysine	arginine	A
	(start) methionine	threonine	lysine	arginine	G
G	valine	alanine	aspartate	glycine	U
	valine	alanine	aspartate	glycine	C
	valine	alanine	glutamate	glycine	A
	valine	alanine	glutamate	glycine	G

First go to the first column at the far left, it represents the first letter. Once you have found the first letter of your codon you have narrowed down the amino acids to 16.

Look across the top for your second letter. Once you locate it, follow it down to the area where your first letter is. Now you have narrowed your target amino acids down to four.

Locate the third letter on the far right and follow it across taking care you are in the same row as the first letter. You have now located your target amino acid.

Enzyme: A specialized _____ used to _____ up a chemical _____.

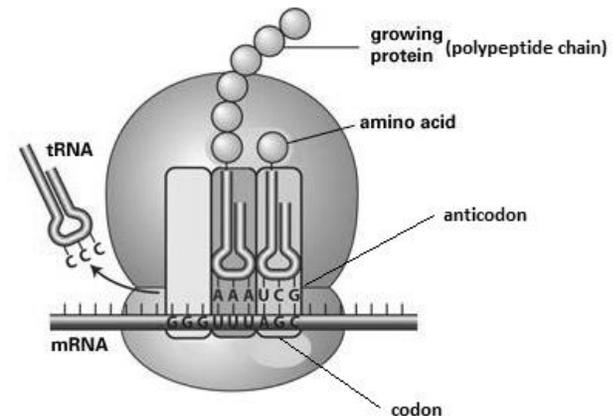
Polymerase: Specialized _____ which _____ polymers from _____ using _____ synthesis.

Codon: _____ nucleotides which _____ for a specific _____.

Anticodon: _____ the _____ and is carried by the _____.

Amino Acid: _____ of _____.

Polypeptide chain: Long _____ of _____ bonded together which will be _____ into a functional _____.



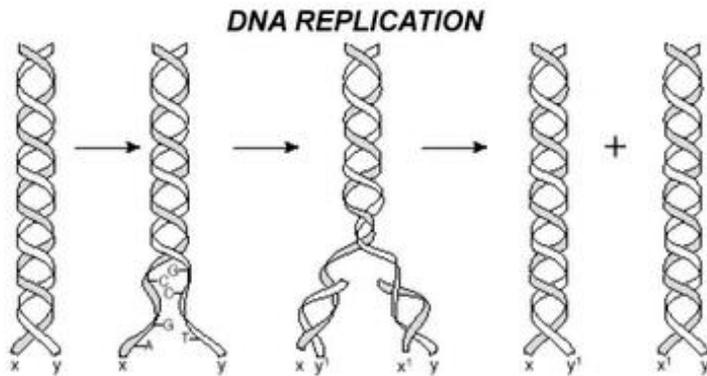
DNA REPLICATION:

DNA replication is the basis for _____ which is a fundamental process that occurs in all living organisms which copies their DNA for each cell and in order to produce offspring.

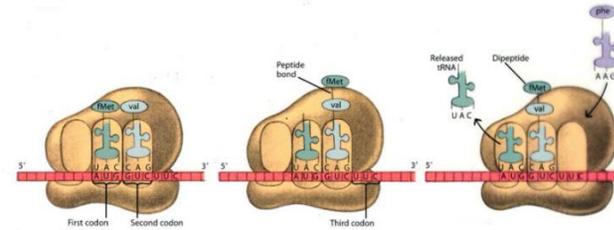
In the process of _____ each strand of the original _____ stranded _____ molecule serves as a _____ pattern for the _____ of the new _____ DNA strand.

Following DNA replication, two identical DNA molecules have been produced from a single double-stranded DNA molecule.

Label the diagram.

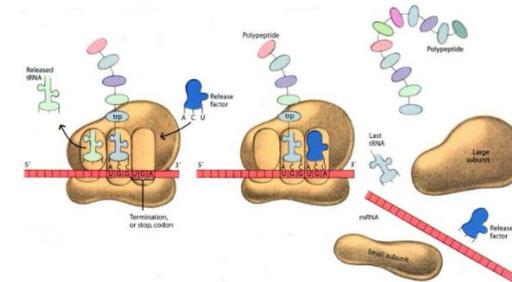


ELONGATION:



Elongation: Additional _____ line up to the _____ being held by the _____. The _____ being carried by the _____ form _____ bonds with previous amino acids creating a _____ of amino acids called a _____ chain.

TERMINATION:



Termination: once the "_____" codon at the end of the _____ is reached a _____ carrying a "_____" binds to the _____ mRNA _____. The release factor causes the _____ complex to _____ freeing the _____ chain to enter the _____ where it will be _____ into a _____.

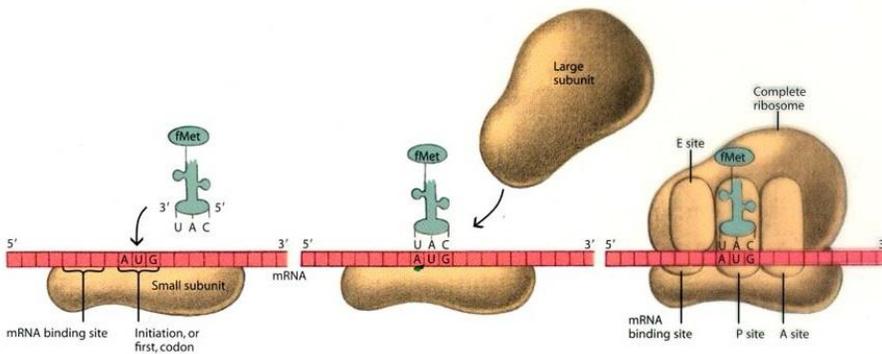
DNA TRANSLATION

_____ is the process where the _____ binds to the ribosome in order to _____ a _____ which is the _____ manifestation of a _____.

DNA Translation has three parts:

(Remember: Each codon is _____ nucleotides long and codes for _____ amino acid.)

INITIATION:

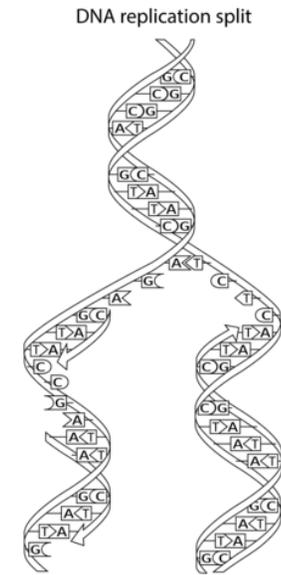


Initiation: The _____ codon on the _____ pairs up with the _____ from the _____ and the _____ complex comes together.

(The first codon always codes for _____ in EVERY living organism.)

WHEN does DNA replication take place?

WHERE does DNA replication take place?



Color the original template DNA strand blue.

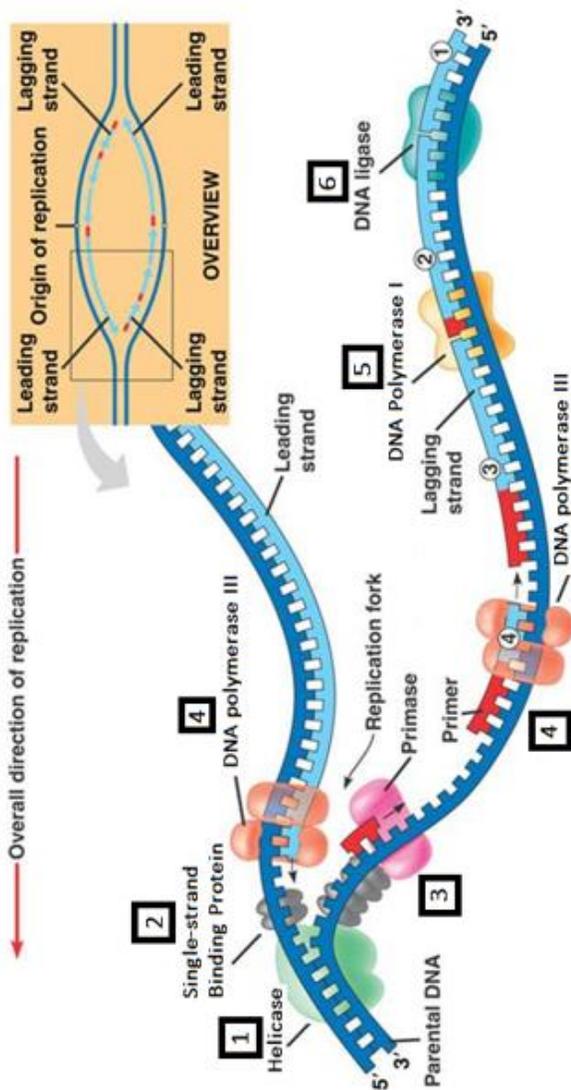
Color the newly synthesizing DNA strand red.

Write the complimentary DNA strand:

Temp DNA: TTA GCG GTA ATC CAT AAG CGT

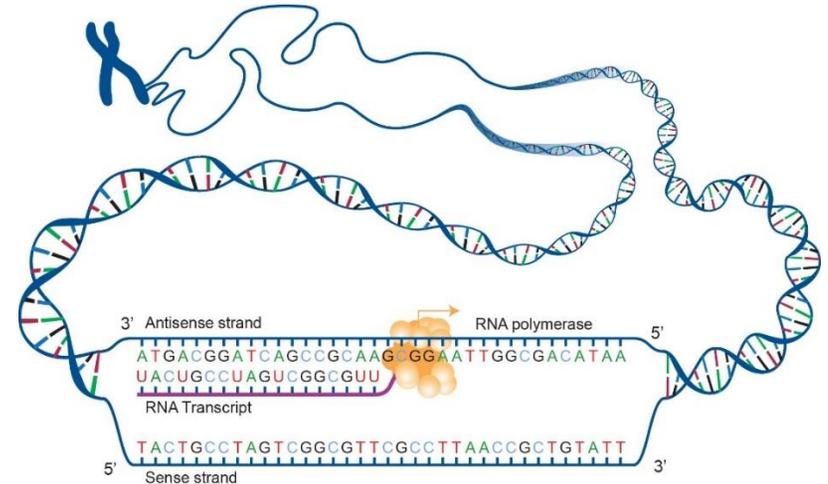
New DNA: AAT _____

DNA REPLICATION:



1. Helicase: _____ which _____ the _____ molecule.

2. Single-Strand Binding Proteins: _____ which _____ the DNA strands _____ and _____ to prevent rebinding and rewinding of the DNA helix.



Only _____ gene is transcribed by a _____ RNA polymerase at a time.

Sometimes there are _____ locations on a DNA strand where _____ are _____ multiple different genes.

The RNA polymerase transcribes the gene while connected to the _____ DNA strand. By using the antisense DNA strand a RNA version of the _____ DNA strand is made. The sense DNA strand is the functional gene.

Once the RNA transcription is complete the newly synthesized RNA polymer is called _____ RNA.

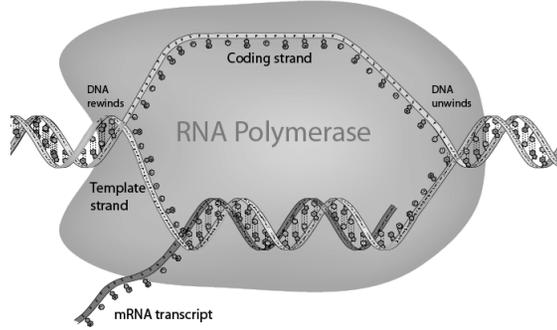
The RNA polymerase drops away from the DNA template allowing the antisense and sense DNA strands to rebind by _____ bonding and recoil.

The _____ drops away from the DNA and _____ the nucleus in order to bind to a ribosome for translation.

DNA TRANSCRIPTION

_____ is the process which transcribes (_____) a specific gene (a _____ of _____) into messenger RNA (_____) by the _____.

DNA transcription takes place in the _____.



The RNA _____ is the _____ which _____ the _____, _____ the _____, and then _____ a mRNA _____ which is _____ to the _____ sequence.

DNA Adenine = mRNA _____ DNA Thymine = mRNA _____

DNA Cytosine = mRNA _____ DNA Guanine = mRNA _____

mRNA has _____ instead of _____.

3. **Primase:** _____ which _____ RNA _____ to help the DNA _____ III attach to the DNA _____.

4. **DNA Polymerase III:** _____ which attaches to the _____ nucleotides then precedes to _____ DNA in the _____ ' to _____ ' direction and _____ the corresponding _____.

5. **DNA Polymerase I:** Enzyme which _____ over the newly _____ DNA looking for _____ and left over _____. The _____ and RNA _____ are _____ and _____ with _____.

6. **DNA Ligase:** Enzyme found along the _____ strand (_____ fragments) the Ligase _____ the Okazaki fragments together to make one _____ continuous _____.

Leading Strand: Long _____ strand of newly _____ DNA in the _____ ' to _____ ' direction.
Lagging Strand: _____ smaller strands of _____ called Okazaki _____ which require more _____ and _____ to be completed.

PROTEIN SYNTHESIS

_____ is the process by which the target segment (_____) of a DNA strand is first transcribed into _____. The mRNA strand is then translated into an _____ chain (_____) which will later be folded into a _____.

PROTEIN SYNTHESIS HAS TWO PARTS...

1. DNA TRANSCRIPTION

Takes place in the _____. During DNA _____ the RNA _____ reads the _____ and creates a _____ messenger _____ strand.

2. DNA TRANSLATION

The _____ leaves the nucleus and _____ to a _____. The ribosome _____ the _____ and build a _____ chain. The polypeptide chain will then enter the _____ to be _____ into a _____.

Use the words from the word bank to fill in label the diagram below. (One word is used twice.)

Cytoplasm Nucleus mRNA
Amino acids DNA ribosome

