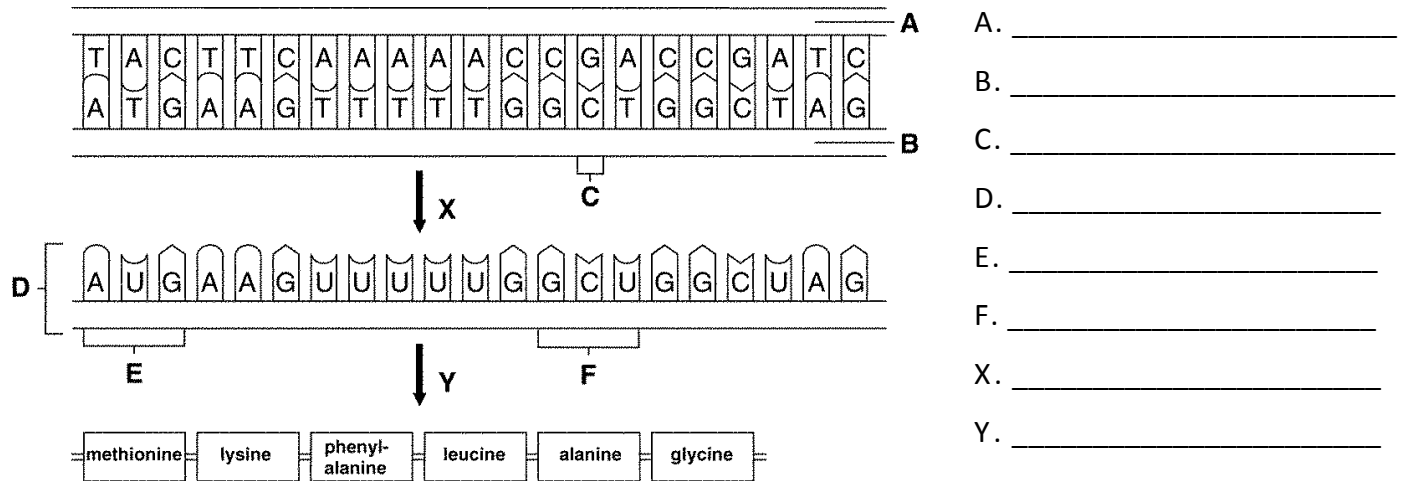


DNA, RNA, Protein Synthesis, & Mutation

This assignment is designed to go along with the PowerPoint on DNA, RNA & Protein Synthesis. We studied the coding of a protein (via PPT, video clips, etc.) to help you understand how codons and anti-codons work inside a living cell. This exercise will ultimately help you understand the mechanisms of protein synthesis.

Identify and **Label** the diagram below by stating what each part of the diagram represents.



I. DNA and RNA

Using the DNA strand below as the original strand, complete the following data table.

1. The sequence of bases in the new strand of DNA if the original strand we are to replicate
2. The sequence of bases in the mRNA produced from the original DNA
3. The sequence of bases needed by the tRNA's if they were to pair with the mRNA in #2 above
4. The sequence of amino acids that would be assembled in the polypeptide chain. (NOTE: use codon table).

DNA Strand	(1) DNA Replicate	(2) mRNA	(3) tRNA	(4) Amino Acid Sequence	Name of Amino Acid
5'					
A					
G					
T					
A					
T					
G					
T					
T					
G					
T					
A					
A					
G					
C					
T					
3'					

II. MUTATION

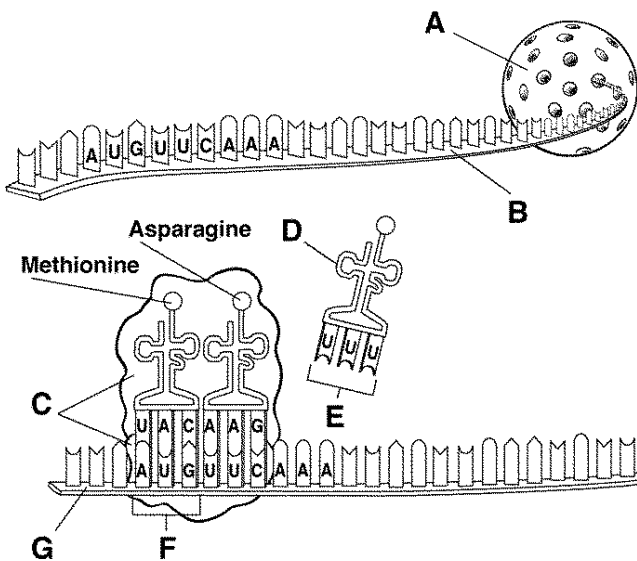
A. Assume that the base in position 6 of the original DNA strand mutates to an "A." How will the sequence of 1, 2, 3, and 4 be affected?

B. Suppose the base in position 2 gets shifted to position 16; how will the sequence of 1, 2, 3 and 4 (above) be affected?

C. If the base in position 6 is changed to a "T," how will the sequence of 1, 2, 3 and 4 (above) be affected?

III. LIFE! What does it mean? Write a paragraph discussing what you found in answers A, B, and C.

IV. Label the drawing below:



- A. _____
- B. _____
- C. _____
- D. _____
- E. _____
- F. _____
- G. _____

What is this entire process called?

Genetic Code

RNA Codes for Twenty Amino Acids

Assigned English Letters	Codon Triplets	Amino Acid Abbreviation	Amino Acid Name
A	AAA	Lys	Lysine
B	AAU	Asn	Asparagine
C	ACU	Thr	Threonine
D	AGA	Arg	Arginine
E	AUG	Met and Start Codon	Methionine
F	AUU	Ileu	Isoleucine
G	CAA	Gin	Glutamine
H	CAU	His	Histidine
I	CCU	Pro	Proline
K	GAA	Glu	Glutamic acid
L	GAU	Asp	Aspartic acid
M	GCU	Ala	Alamine
N	GGU	Gly	Glycine
O	GUU	Val	Valine
NONE	UAA	None stop codon	
P	UAU	Tyr	Tyrosine
R	UCU	Ser	Serine
S	UGG	Tryp	Tryptophane
T	UGU	Cys	Cysteine
U	UUA	Leu	Leucine
W	UUU	Phe	Phenylalanine

VI. Using the mRNA triplet code units and the assigned English letter equivalents, translate the following message:

AUG/AGA/GGU/AAA/UAA/AUG/CCU/UGG/UAA/AUG/UGU/CAU/AUG/UAA/AUG/ACU/
GUU/AGA/AUG/UAA/AUG/GUU/AUU/UAA/AUG/GAU/CCU/AUU/AUG/UAA!

VII. List the **amino acid sequence** for the codon sequence in the question above.

Codon Table

There are 64 different codons but only 20 amino acids

