

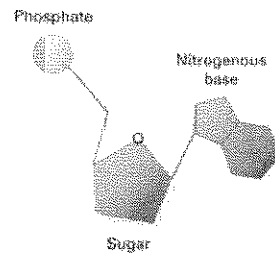
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## *DNA & RNA Structure Worksheet*

DIRECTIONS. Answer the following questions about DNA & RNA structure.

1. What does DNA stand for? \_\_\_\_\_
2. What are the monomers that make up DNA called? \_\_\_\_\_
3. Name the 3 main parts to the monomers names in #2. Then label them on the picture.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_



4. Name the 4 nitrogenous bases that make up DNA molecules. Indicate if they are pyrimidine or purine.

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

5. Which nucleotides (A,C,T,G) base pair (match up) with each other? What holds them together?

- a. \_\_\_\_\_
- b. \_\_\_\_\_

6. Describe the structure of a double strand of DNA. Use the analogy to a ladder in your description.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

7. Name the 2 differences between the structures of DNA & RNA molecules:

- a. \_\_\_\_\_
- b. \_\_\_\_\_

8. The following is the coding strand of DNA. Write the complementary strand (template strand). Label the 5' and 3' ends.

**5' – A T C G T G C G T G A T A T T T C C G A G T – 3'**

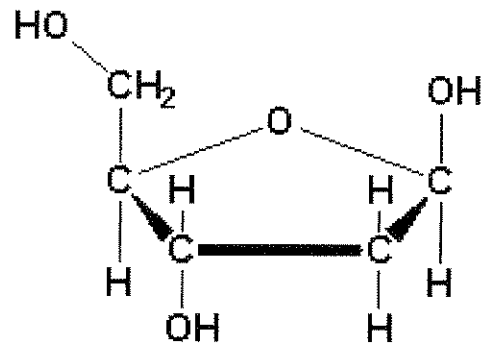
\_\_\_\_\_

\* HONORS ONLY\*

9. Number the Carbon atoms (#1-5) in this deoxyribose molecule.

10. The phosphate group of a nucleotide is attached to which carbon atom of deoxyribose? \_\_\_\_\_

11. The next nucleotide is attached to which carbon atom of deoxyribose? \_\_\_\_\_



**Deoxyribose**

## Protein Synthesis Worksheet

1. In DNA, adenine binds with \_\_\_\_\_ and guanine binds with \_\_\_\_\_.
2. In RNA, adenine binds with \_\_\_\_\_ and guanine binds with \_\_\_\_\_.
3. Transcription takes place in the \_\_\_\_\_; translation takes place in the \_\_\_\_\_.
4. The building blocks of nucleic acids are \_\_\_\_\_.
5. When the DNA “cookbook” unzips, a complete protein “recipe” called a \_\_\_\_\_ is exposed.
6. At that time, a complementary copy of that “recipe” is made. Scientifically stated, \_\_\_\_\_-RNA is formed from RNA \_\_\_\_\_, in a process called \_\_\_\_\_.
7. When this “string” of RNA leaves the nucleus through a nuclear pore, it goes into the cytoplasm and binds to another player, \_\_\_\_\_-RNA (the “site of protein synthesis”).
8. The \_\_\_\_\_-RNA “recipe” is “read” and a protein is assembled in a process called \_\_\_\_\_.
9. The building blocks of proteins are \_\_\_\_\_, so another form of RNA is necessary to deliver those building blocks to the site of protein synthesis. This is \_\_\_\_\_ RNA.
10. The 3 nitrogen bases of DNA are called \_\_\_\_\_; the 3 nitrogen bases of \_\_\_\_\_ are called anticodons; the 3 nitrogen bases of \_\_\_\_\_ are called codons.
11. All of the above steps take place during what PHASE of the cell cycle? \_\_\_\_\_
12. Know these steps in order, and be sure to learn the associated vocabulary.
13. Chromatin is \_\_\_\_\_.
14. A chromosome is \_\_\_\_\_.
15. A gene is \_\_\_\_\_.
16. The genome is \_\_\_\_\_.
17. Using the tRNA Dictionary below, do transcription and translation to build the protein sentence on the next page.

Anti-codon	AA sym	AA abr	Anti-codon	AA sym	AA abr	Anti-codon	AA sym	AA abr	Anti-codon	AA sym	AA abr
CGA	A	ala	GUA	H	his	GGA	P	pro	UCA	S	ser
CGC	A	ala	GUG	H	his	GGC	P	pro	UCG	S	ser
CGG	A	ala	UAA	I	iso	GGG	P	pro	UGA	T	thr
CGU	A	ala	UAG	I	iso	GGU	P	pro	UGC	T	thr
ACA	C	cys	UAU	I	iso	GUC	Q	glu	UGG	T	thr
ACG	C	cys	UUC	K	lys	GUU	Q	glu	UGU	T	thr
CUA	D	asp	UUU	K	lys	GCA	R	arg	CAA	V	val
CUG	D	asp	AAC	L	leu	GCC	R	arg	CAC	V	val
CUC	E	glu	AAU	L	leu	GCG	R	arg	CAG	V	val
CUU	E	glu	GAA	L	leu	GCU	R	arg	CAU	V	val
AAA	F	phe	GAC	L	leu	UCC	R	arg	ACC	W	trp
AAG	F	phe	GAG	L	leu	UCU	R	arg	AUA	Y	tyr
CCA	G	gly	GAU	L	leu	AGA	S	ser	AUG	Y	tyr
CCC	G	gly	UAC	M	meU	AGC	S	ser	ACU	-	space
CCG	G	gly	UUA	N	asn	AGG	S	ser	AUC	-	space
CCU	G	gly	UUG	N	asn	AGU	S	ser	AUU	-	space

DNA triplets: ACC GTG ATA ACT CGA GCA CTC ATT GGC AAC CGC TTA TGT AGC ATT CCT TCT CTC CTT TTG ATC

mRNA codons: UGG CAC UAU \_\_\_\_\_

tRNA anticodons: ACC GUG AUA \_\_\_\_\_



the polypeptide (too small to be a protein)

peptide bond

Message Source: Larry Flammer, idea developed in 1963