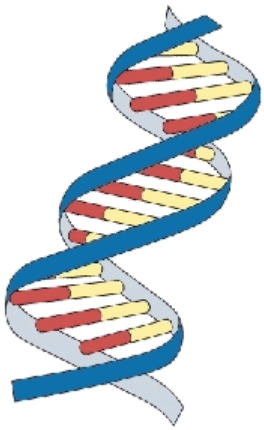
Name:_____

DNA - The Double Helix



In 1953, two scientists (Watson and Crick) established the structure of DNA. The structure is a **double helix**, which is described as a *twisted ladder*. The sides of the ladder are made of alternating sugar and phosphate molecules. The sugar is deoxyribose.

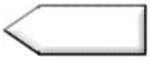
On the diagram on the next page:

☐Color all the phosphates pink (one is labeled with a "P").

☐ Color all the deoxyriboses (D) orange (labeled "D") .

The rungs of the ladder are called bases. The bases have chemical names but are known by their coded letters A, G, T, C. These bases always bond in a certain way. **A**denine will only bond to **T**hymine. **G**uanine will only bond with **C**ytosine. This is known as the "**Base-Pair Rule**". The bases can occur in any order along a strand of DNA. The order of these bases is the code that contains the instructions for everything that our bodies can do. For instance A T T A T T would code for a different trait than A G G A G G. A strand of DNA contains millions of bases. Note that the bases attach to the sides of the ladder at the sugars and not the phosphate.

☐ ***Color the bases on the DNA:***

thymine = yellow  adenine = blue 

guanine = green  cytosine = red 

Nucleotides

The combination of a single base, a deoxyribose sugar, and a phosphate make up a **nucleotide**. DNA is actually a molecule of repeating nucleotides. Examine the nucleotides closer. Two of the bases are purines - adenine and guanine. The pyrimidines are thymine and cytosine. Note that the pyrimidines are single ringed and the purines are double ringed.

☐ Color the nucleotides using the same colors you colored them in the double helix.

☐ The two sides of the DNA ladder are held together loosely by hydrogen bonds (little dots). ***Color the hydrogen bonds black.***

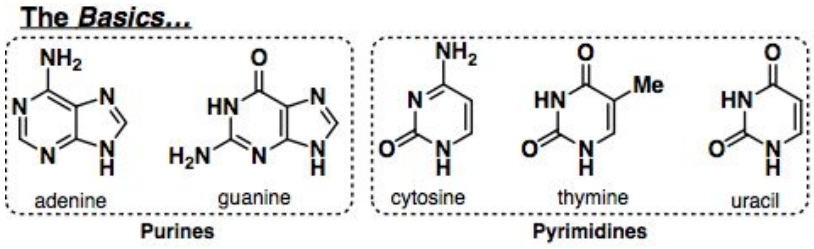
Messenger RNA

DNA is only in the nucleus of the cell. The only problem is that the DNA is too big to go through the nuclear pores to communicate with the rest of the cell and do what it is supposed to do. A chemical is used to read the DNA in the nucleus. That chemical is **messenger RNA**. The messenger RNA (mRNA) is small enough to go through the nuclear pores. It takes the "message" of the DNA to the ribosomes and "tells them" what **proteins** are to be made. Recall that proteins are the body's building blocks and are made of individual amino acids joined into a long chain. Imagine that the code taken to the ribosomes is telling the ribosome what is needed - like a recipe.

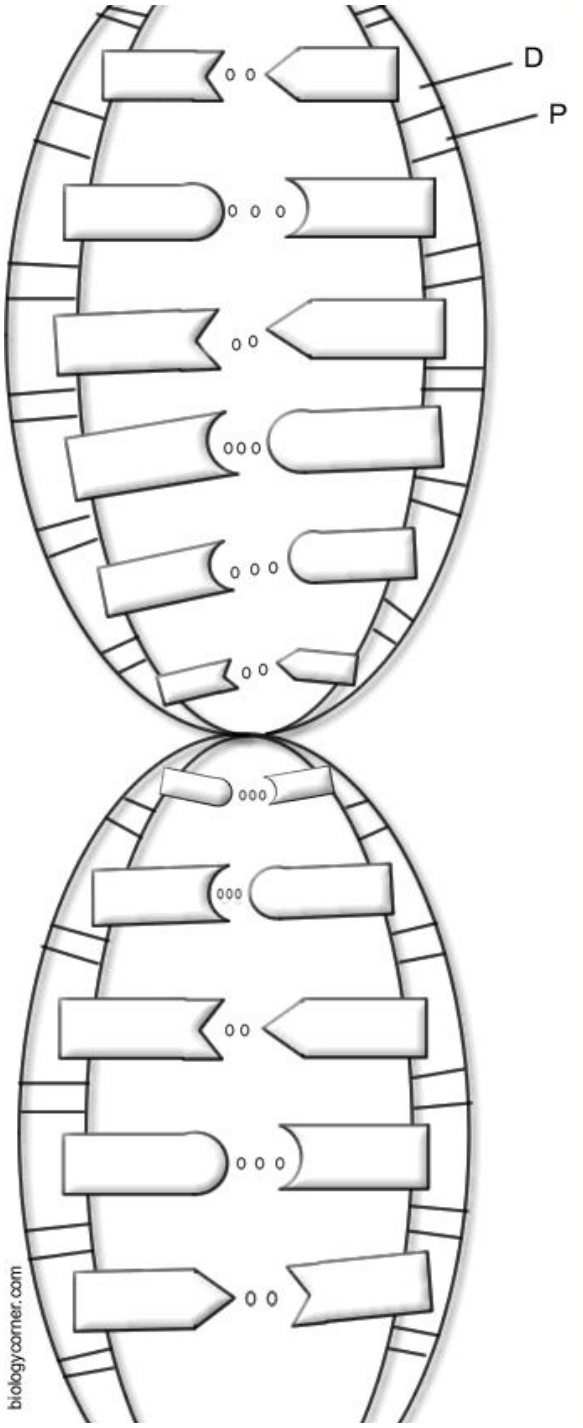
Messenger RNA is similar to DNA, except that it is a single strand, and it has no **T**hymine. Instead of T, mRNA contains the base **Uracil**. In addition to that difference, mRNA has the sugar ribose instead of deoxyribose. RNA stands for **ribonucleic acid**.

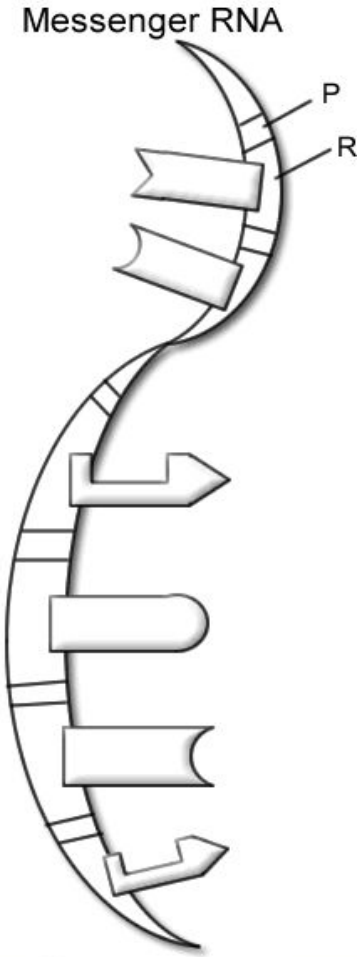
☐***Color the mRNA as you did the DNA.***

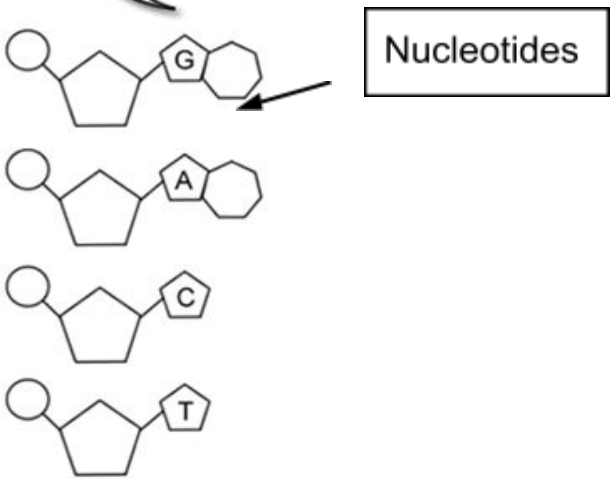
☐***Color the uracil brown.***



DNA







Decoding DNA - fill in the table

	Adenine (A)	Thymine (T) / Uracil (U)	Guanine (G)	Cytosine (C)
Color in model				
Bonds with _____				
# of hydrogen bonds				
# of rings ***Purine or Pyrimidine?***				