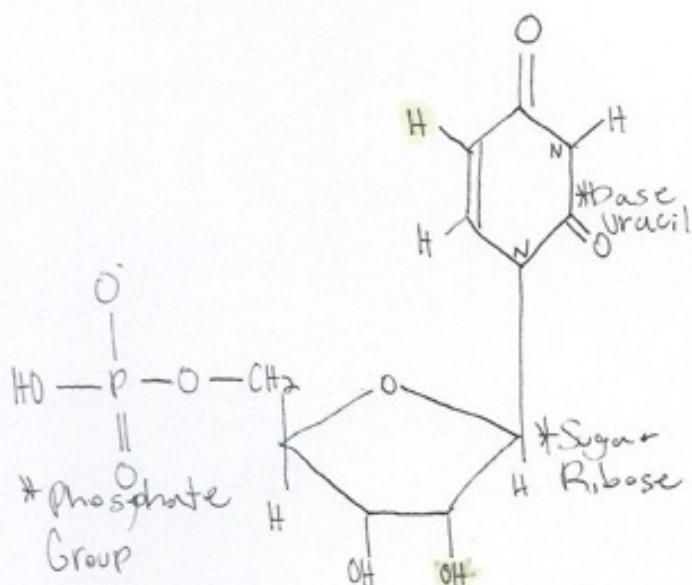


## RNA Nucleotide



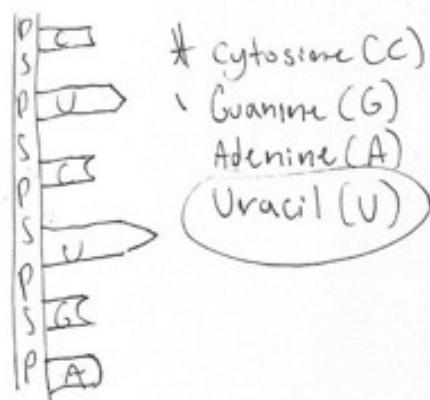
- \* A cell uses 3 kinds of RNA
  - Messenger RNA (mRNA)
  - Ribosomal RNA (rRNA)
  - Transfer RNA (tRNA)

## Transcription

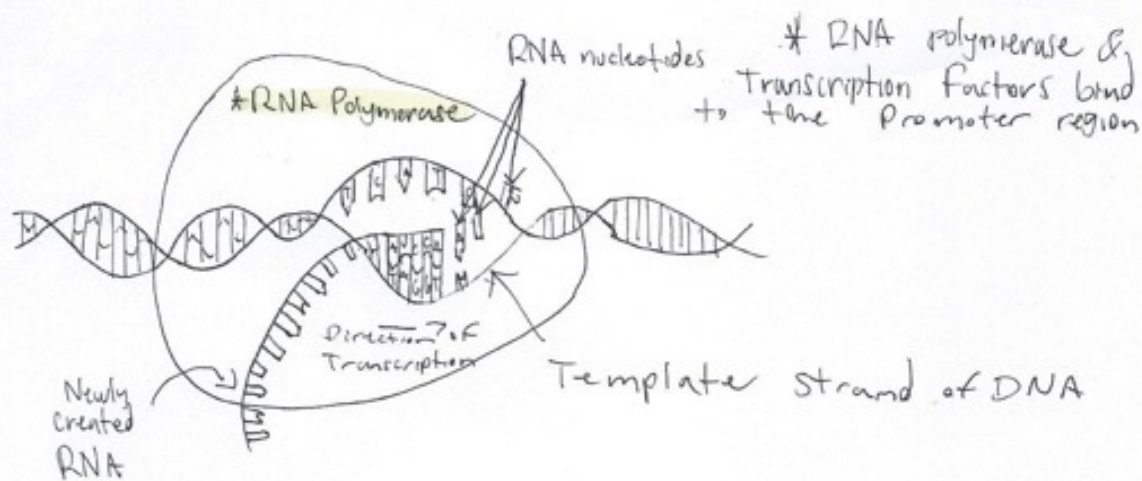
- \* RNA Polymerase is the enzyme that catalyzes the transcription process/reaction
- \* The sequence of the promoter region determine which proteins bind
- \* Promoter sequences determine when, where, & how much the gene is transcribed
- \* Transcription factors can be activators or repressors

## RNA →

\* Single strand



- \* Carries protein-encoding information and controls how information is used
- \* Can function as an enzyme



# Translation

\* Requires: tRNA, rRNA, mRNA  
plus amino acids & Energy

\* The Ribosome (mostly made of RNA + small protein) is the catalyst



\* AUG marks the beginning of translation

## Ribosomes

\* The protein-making factories of cells

- They use mRNA to Direct the making of Protein

\* Ribosome is made of two subunits

### ① Translation Initiation

\* Small Ribosomal Subunit binds to mRNA

\* tRNA carrying methionine binds to Start Codon (AUG)

\* Forms initiation complex

### ② Translation Elongation

\* tRNA for the second amino acid binds to the mRNA in A site

\* Second Amino Acid joins initiation complex

\* First peptide bond forms as new amino acid arrives

\* Amino Acid chain extends

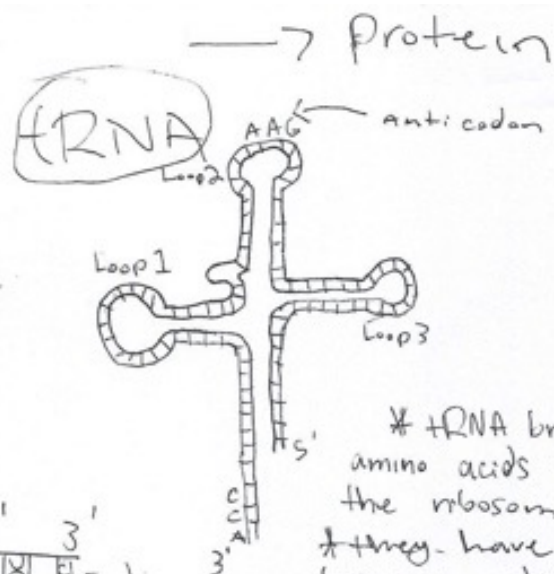
### ③ Translation Termination

\* Elongation continues until the ribosomes reach a stop codon

\* No tRNA Binds \* Release factor Binds

\* Complex Falls apart

\* Polypeptide is folded into 3D shape



\* tRNA brings amino acids to the ribosome  
\* They have two business ends  
\* The Anticodon is the complementary to the mRNA

# DNA → RNA → Protein

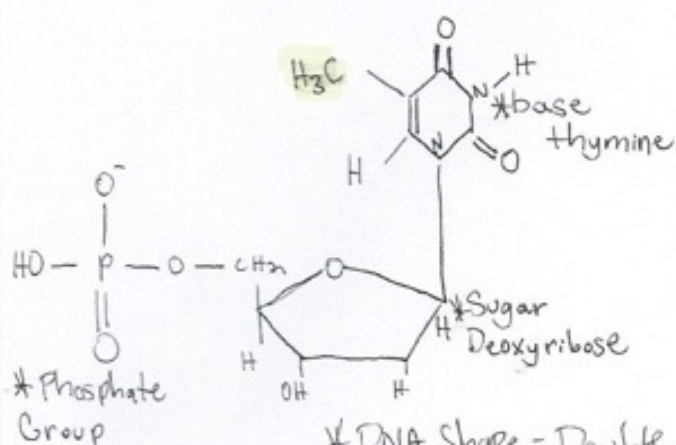
Process Name?	Replication	Transcription	Translation
* Catalyst of Reaction?	* DNA Polymerase	* RNA Polymerase	* Ribosome
* Sequence that initiates this?	* Primer Sequence During elongation	* RNA Polymerase binds to promoter sequence	* The start codon sequence
* What else binds to this sequence?	* 2 DNA strands	* RNA nucleotides	* Amino acid methionine
* Occurs in what stage of cell cycle?	* S phase	* G1 phase	* G1 phase
* Where does reaction occur?	* nucleus	* nucleus	* Cytosol
* Template is read in what Direction?	* 3'-5' Direction	* 5'-3' Direction	* 5'-3' Direction
* New molecule is made in what Direction?	* 5'-3' Direction	* 5'-3' Direction	* 5'-3' Direction



# DNA & RNA

\* DNA & RNA are both Polymers of Nucleotides

## DNA Nucleotide

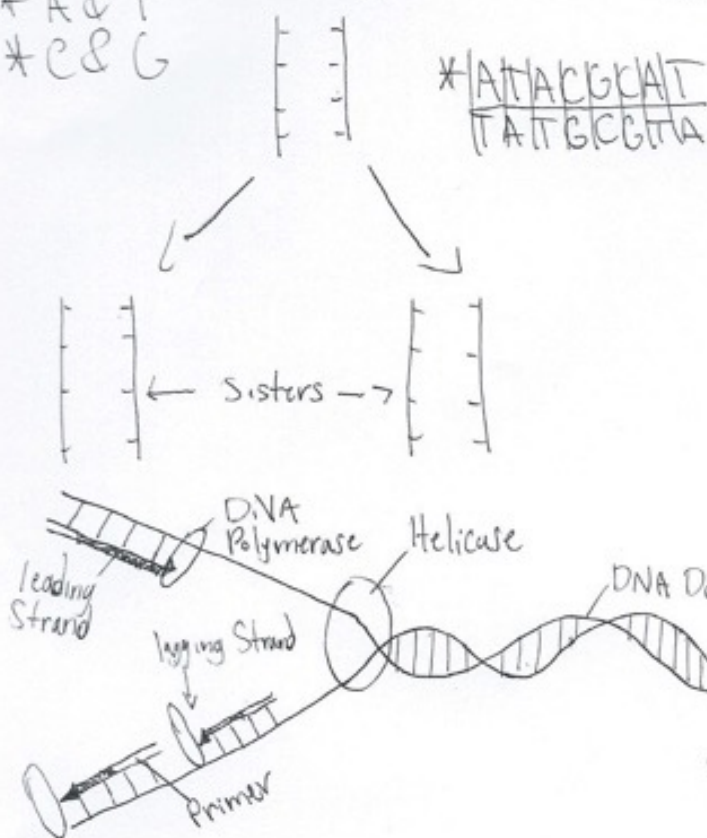


\* DNA Shape = Double Helix

## DNA Replication

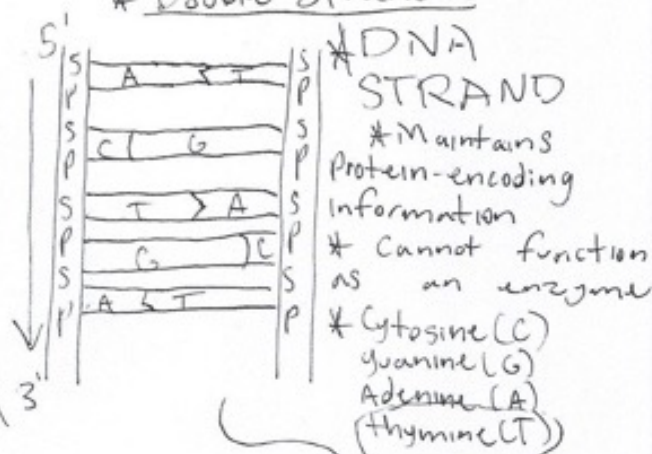
\* The two Strands of DNA are held together by weak hydrogen bonds between Complementary base Pairs

\* A & T  
\* C & G



# DNA

## \* Double Stranded



## \* DNA STRAND

\* Maintains Protein-encoding Information  
\* Cannot function as an enzyme  
\* Cytosine (C)  
guanine (G)  
Adenine (A)  
thymine (T)

\* New Nucleic acid strands are made in 5 Prime to 3 Prime Direction  
\* Each Strand of the Double Helix runs in opposite Direction. (Antiparallel)

## Steps for Replication

\* Helicase UnWinds the Double Helix  
\* Primase puts down short pieces of RNA pieces (primer)  
\* DNA POLYMERASE reads each strand and adds complementary bases  
\* The lagging strand is made continuously from one primer  
\* The lagging strand is different from Leading strand because the leading strand is continuously made while the lagging one is made from several

