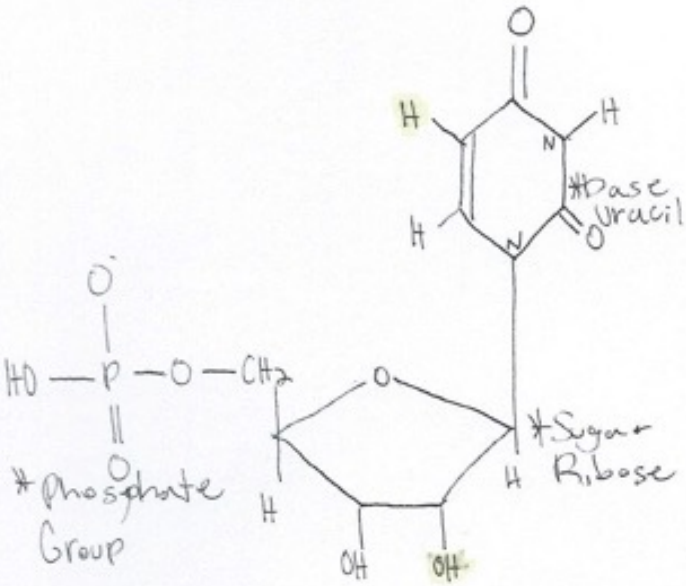
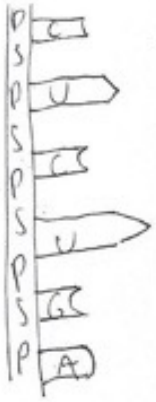
RNA Nucleotide



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

RNA →

* Single Strand

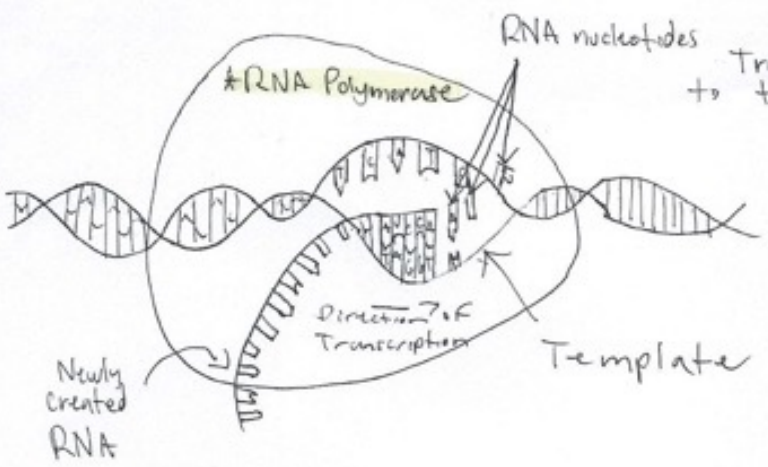


* cytosine (C)
* Guanine (G)
  Adenine (A)
  Uracil (U)

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

Transcription

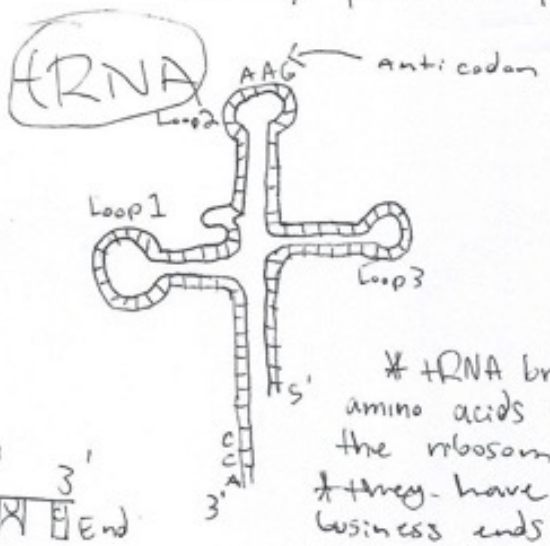
* RNA Polymerase is the enzyme that catalyzes the transcription process/reaction
* The sequence of the promoter region Determine which Proteins Bind
* Promoter sequences Determine when, where, & how much the gene is transcribed
* Transcription Factors can be activators or repressors



* RNA polymerase & Transcription factors bind to the Promoter region

Translation → Protein

* Requires: tRNA, rRNA, mRNA plus amino acids & Energy
* The Ribosome (mostly made of RNA + small protein) is the catalyst



* tRNA brings amino acids to the ribosome
* they have two business ends
* The Anti codon is the complementary to the mRNA

* 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

DNA → RNA → Protein

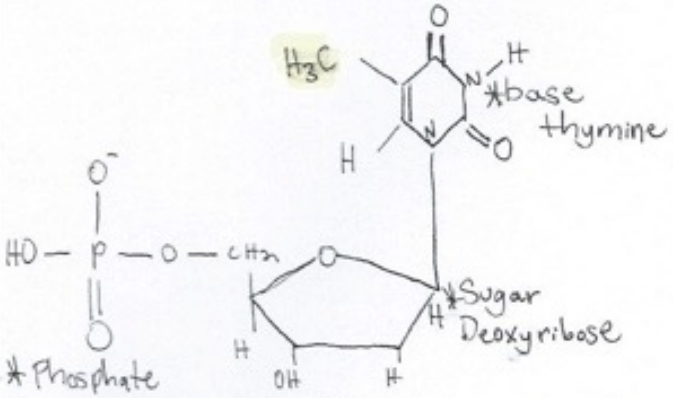
	DNA	RNA	Protein
*Process Name?	*Replication	*Transcription	*Translation
*Catalyst of Reaction?	*DNA Polymerase	*RNA Polymerase	*Ribosome
*Sequence that initiates this?	*Primer Sequence During elongation	*RNA Polymerase binds to promoter sequence	*the start codon sequence
*~~what else~~ binds to this 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 →

* DNA & RNA are both Polymers of Nucleotides

DNA Nucleotide



* Double Stranded

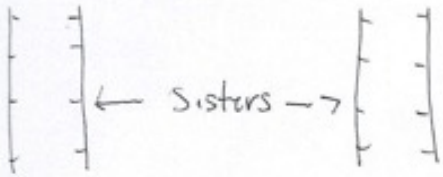
*DNA STRAND
* Maintains Protein-encoding information
* Cannot function as an enzyme
* Cytosine (C) guanine (G) Adenine (A) thymine (T)

* DNA Shape = Double Helix

DNA Replication

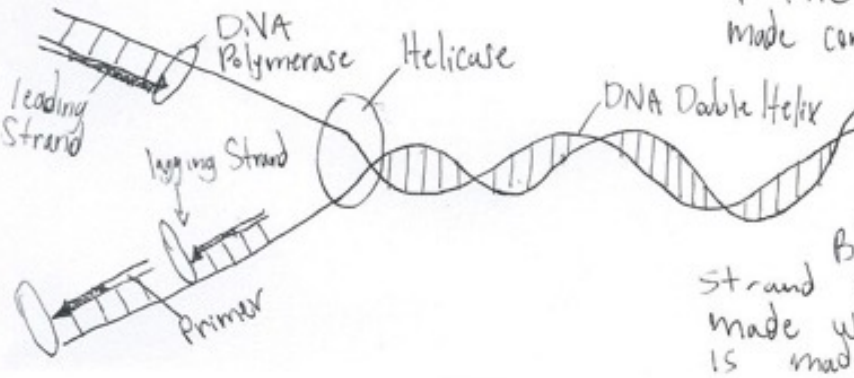
* The two Strands of DNA are held together by Weak hydrogen bonds between Complementary base Pairs
  * A & T
  * C & G

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



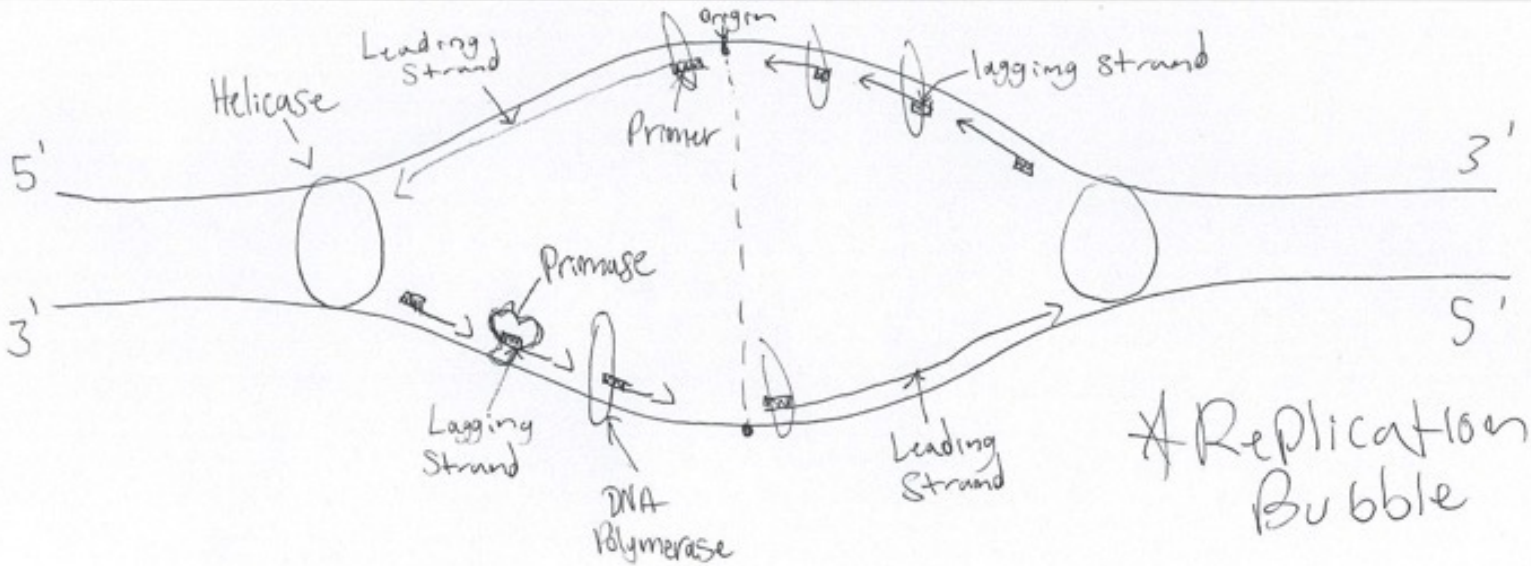
Steps for Replication

* 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

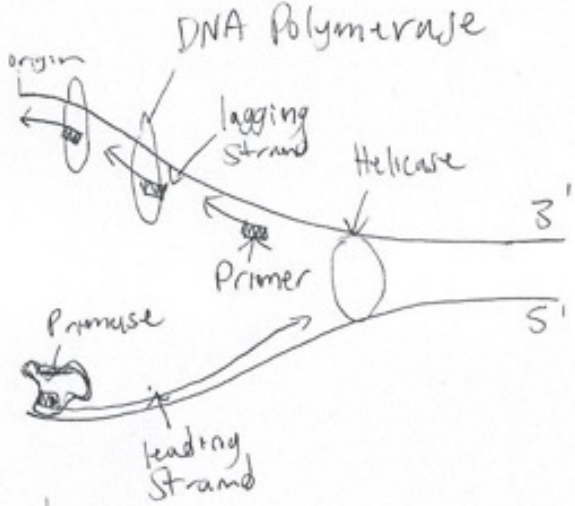


* The lagging Strand is different from Leading Strand

Because the leading strand is continuously made while the lagging one is made from several



*Replication Bubble



*Replication Fork