

	Replication	Transcription	Translation
What is it?	Perpetuation of genetic material.	Generation of template for protein synthesis.	Generation of protein.
Template	dsDNA	dsDNA (-) template strand	mRNA
When does it happen?	During S Phase	Not phase limited	Not phase limited
Where does it begin?	Origin of replication (ORI Binding Proteins)	Promoter -TATA (-10) -consensus (-35)	At the trifecta: -5' CAP -Kozak sequence (3bp upstream of AUG) -AUG only in context of Kozak!
Where does it end?	-End of replicon -Replicons run into another	-Terminator/PolyA signal(s) -Hairpin loops	Stop Codons -UAA -UAG -UGA
Catalyst?	DNA Polymerase III	RNA Polymerase I -> rRNA RNA Polymerase II -> mRNA RNA Polymerase III -> tRNAs	Ribosomes with charged tRNAs
What Accessory factors are required?	Helicase, SSBPs, DNaG Primase, Topoisomerase, DNA Ligase, RNA Pol I (or RNAase HI, Exonuclease FEN1)	Transcription Factors recognize promoter elements. Polymerase cannot recognize the promoter.	Several eukaryotic initiation factors eIF-4F, eIF-4B, eIF-3, eIF-5, 40S, 60S, 80S, charged t-RNAs; ENERGY!
Product	Genome replicate	Polycistronic mRNA Monocistronic mRNA	Protein
Primer Required?	Yes – DNA Pol can only extend, never initiate	No	No
What gets synthesized?	Two new daughter strands that are semi-conservatively replicated	- One mRNA strand that matches DNA message sense sequence (also known as coding sequence - CDS); - The single mRNA is complementary to the template or antisense strand	One polypeptide per open reading frame
Proofreading?	Yes!	No!	It's complicated

Let me know if I made a mistake when putting this table together by emailing dmap02@stanford.edu.