

Name _____

Date _____ Per _____

Chapter 10 – How Proteins are Made

Proteins	
Ribosomes	
Difference between DNA & genes	
Structure and function of DNA	
Base-pairing rules	
From genes to proteins	

Differences between RNA and DNA

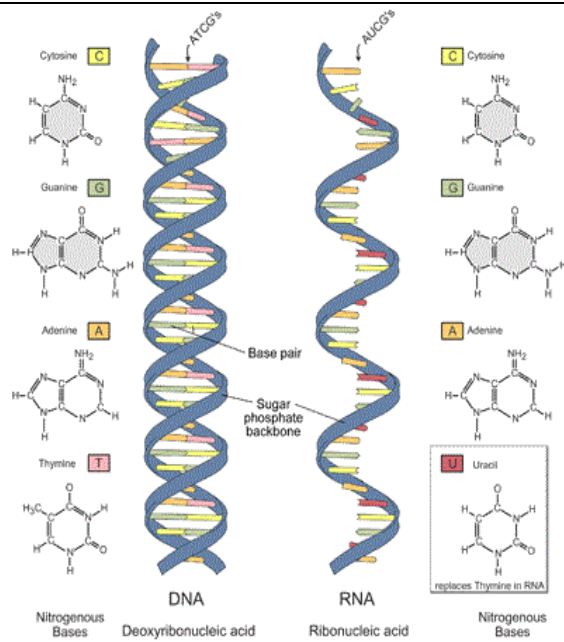


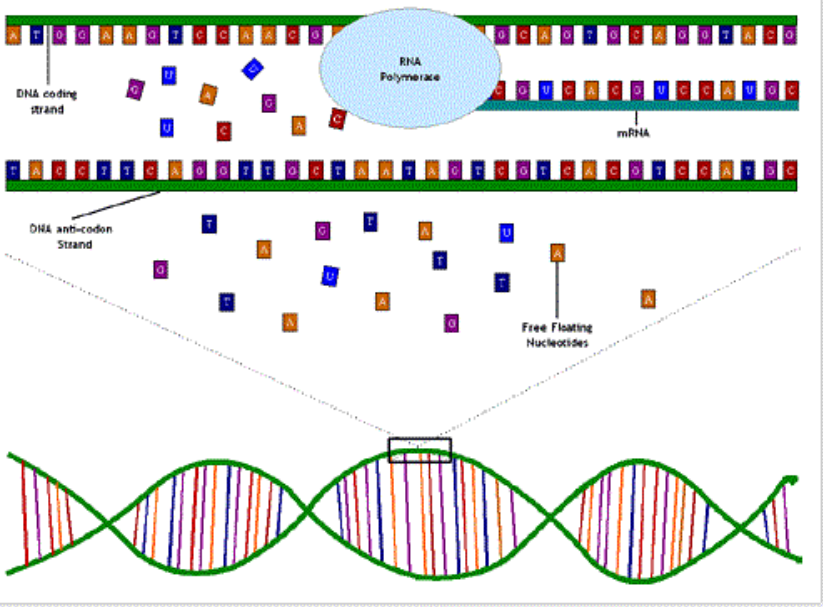
Image adapted from: National Human Genome Research Institute.

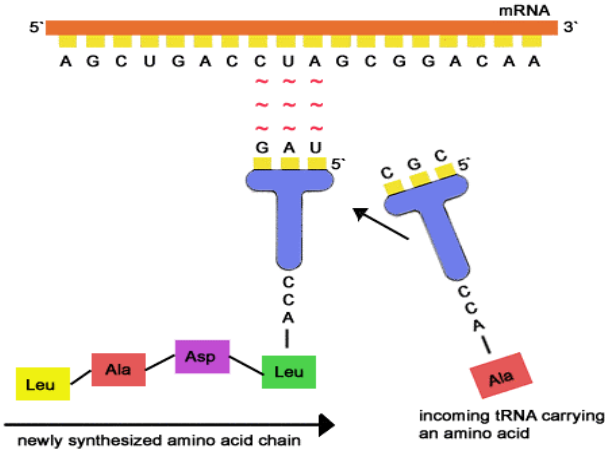
Transcription

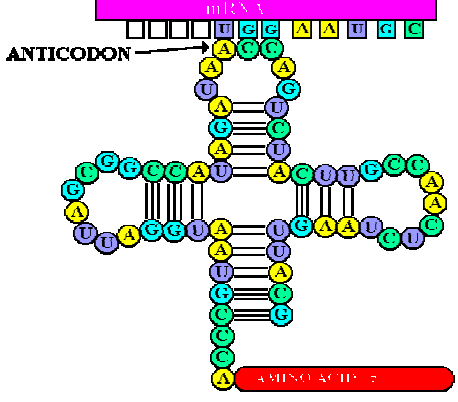
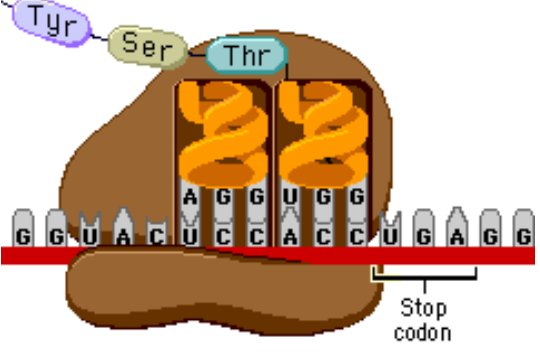
Translation

Protein Synthesis

Translation -1st
step of protein
synthesis

RNA polymerase	
Transcription – 3 steps	 <p>The diagram illustrates the process of transcription. At the bottom, a DNA double helix is shown with a green box highlighting the region being transcribed. Above this, the DNA strands are separated into two single strands. The top strand is labeled 'DNA coding strand' and has the sequence 5'-A-T-G-C-A-A-T-T-C-G-A-A-C-G-3'. The bottom strand is labeled 'DNA anti-codon strand' and has the sequence 3'-T-A-C-G-T-T-A-A-G-C-T-T-G-C-5'. A blue oval labeled 'RNA Polymerase' is positioned between the two DNA strands, moving along the coding strand. To the right of the polymerase, a single-stranded mRNA molecule is being synthesized, with the sequence 5'-U-A-C-G-U-U-A-A-C-G-3'. Below the DNA strands, several 'Free Floating Nucleotides' are shown as small colored squares (A, T, C, G, U) that can be incorporated into the growing mRNA strand. The mRNA sequence is complementary to the DNA coding strand and identical to the DNA anti-codon strand.</p>
Transcription – Step 1	
Transcription – Step 2	
Transcription – Step 3	

Stop signal	
Transcription – where it takes place	
Messenger RNA (mRNA)	
Translation	 <p>The diagram illustrates the process of translation. At the top, a horizontal orange bar represents the mRNA strand, labeled 'mRNA' at its right end. The strand is oriented 5' to 3' from left to right. Below the mRNA, a series of yellow boxes represent the bases: A, G, C, U, G, A, C, C, U, A, G, C, G, G, A, C, A, A. A red dashed line indicates the current position of the ribosome, aligned with the C C U codon. Below this codon, a blue T-shaped tRNA molecule is shown with its anticodon G A U (in yellow boxes) and its 5' end. The tRNA is carrying a growing amino acid chain, represented by a horizontal line with four colored boxes: Leu (yellow), Ala (red), Asp (purple), and Leu (green). An arrow points from the tRNA to the amino acid chain, labeled 'newly synthesized amino acid chain'. To the right, another blue T-shaped tRNA molecule is shown, labeled 'incoming tRNA carrying an amino acid'. It has an anticodon C G C (in yellow boxes) and is carrying an Ala (red) amino acid. An arrow points from this tRNA towards the ribosome, indicating its entry into the process.</p>
Genetic code	
Translation – where it takes place	

<p>Transfer RNA (tRNA)</p>	
<p>Ribosomal RNA (rRNA)</p>	
<p>Ribosome</p>	
<p>7 Steps of Translation</p> <p>Step 1</p>	

Step 2	
Step 3	
Step 4	
Step 5	

Step 6	
Step 7	