Protein Synthesis Activity

Part 1: Modeling Transcription and Translation

Create a diagram or flow chart of the processes of transcription and translation. Your model should be an accurate representation of the events that occur first in transcription in the nucleus and then in translation in the cytoplasm,

When developing and explaining your model, be sure to include definitions or descriptions of the following terms and structures:

Gene	protein synthesis	energy
DNA	ribosome (large and small subunits)	codons
Nucleotides: A,T,C and G versus A,	A, P and E sites	stop codons
U, G and C,	tRNA	anticodons
RNA modifications after transcription	rRNA	initiation
mRNA	start codon (methionine)	elongation
RNA polymerase	aminoacyl-tRNA synthase	termination
poly(A) tail	amino acids	polypeptide
5' cap	peptidyl transferase	
translation	polypeptide	

For the purposes of this activity, assume that there are no introns in the mRNA transcript. In other words, you do not have to go into specifics regarding RNA processing but should know the basics of what happens.

Instructions:

1. Use marker on a large sheet of paper to draw a cell's plasma membrane and nuclear membrane. The nucleus should have a diameter of about 12 inches.

2. Draw a DNA molecule in the nucleus that contains the following DNA sequence:
   Template Strand: 3' TAC TTT AAA GCG ATT 5'
   Non-template Strand: 5' ATG AAA TTT CGC TAA 3'

3. Use cutout pieces of paper or draw structures to represent the various enzymes, ribosome subunits, amino acids, and other components.

4. Use the pieces you assembled to build an accurate model of the processes of transcription and translation.

5. When you feel that you have developed a good working model, use it to explain the processes of transcription and translation to another student or to your instructor.