1.   What is the Central Dogma of Biology?   Draw and label a diagram.
2.   Explain how transcription occurs. Use the terms: hairpin loop, promoter, template.
3.   Explain how translation occurs. Use the terms: A-site, P-site, tRNA, mRNA, rRNA, codon, anticodon, nonsense codon.
4.   Draw a replicating fork, labeling the 5' and 3' ends.
   a. Identify the leading strand and the lagging strand
   b. Why is one strand synthesized discontinuously?
5.   In regard to the mRNA sequence provided below:
   a.   What are the first three amino acids in the sequence of the polypeptide it codes for?
   b.   Is it likely that this mRNA codes for the beginning of a protein? Why?
   c.   What is the DNA sequence that was transcribed to this mRNA?

   3' **AUG** *UAA* **UUC** *ACA* **CCA** *UCA* **CCC** *CCU* **UUG** *AAA* **UGU** *AGC* **UAC** 5'

6.   a.   Name and describe two DNA repair mechanisms.
        b.   Which DNA repair mechanism produces the most errors?

7.   a.   Define mutation.
        b.   What is a mutagen?
        c.   What is the difference between a point mutation and a frameshift mutation?

8.   The plot on the right represents a culture of *E. coli* growing in the presence of glucose and lactose. Sketch in (**labeling each line**) what is happening to the concentration of glucose, the concentration of lactose, and the production a ή-galactosidase, an enzyme that degrades lactose. **Also**, why is there a lag between the two exponential phases? (What is happening?)