**Pre-AP Nucleic Acids and Protein Synthesis Test Review**

*Refer to the following questions and vocabulary to help you to review for the test.*

* Required vocabulary: nucleic acids, nucleotides, purine, pyrimidine, anti-parallel, helix, proteins, amino acids, codon, polypeptide, polypeptide bonds, mutagen, frameshift, point, substitution, translocation, inversion, introns, exons, histones, chromosome, chromatin, semi-conservative, promoter, nonsense mutation, RNA splicing, silent mutation, anticodon, Okazaki fragments, and gene
* DNA is an example of what type of macromolecule?
  1. Draw a cell with a chromosome and label the following: chromatids, centromere, gene, nucleus, cell
     1. What type of cell have you created- a prokaryote or eukaryote?
        1. How do you know?
  2. What is a double helix?
  3. When DNA is stretched out during Interphase of the cell cycle (with a length of 3 meters), DNA is called what?
  4. What is the monomer of DNA?
     1. What are the subunits/parts of that monomer?
        1. What type of bond holds the sugar and phosphate together?
     2. What is the name of the sugar in DNA?
     3. Name all the nitrogenous bases in DNA.
        1. What nitrogen bases are purines?
        2. What nitrogen bases are pyrimidines?
        3. What type of bond holds the nitrogenous bases together?
  5. Which part of the DNA contains instructions for coding for proteins?
  6. What does anti-parallel mean within the context of DNA?
  7. What is the direction of reading each strand?
  8. Label the DNA molecule below



* 1. What is the function of DNA?
* Where is DNA located in the eukaryotic cell?
* Where is it located in the prokaryotic cell?
  1. What is the shape of prokaryotic DNA?
  2. What is an example of a prokaryote?
* What is DNA Replication?
  1. What is produced during DNA Replication?
  2. What is the first step of DNA Replication?
  3. How is the newly created DNA strand created? By bases? By sugar? By phosphates? By nucleotides?
  4. What is the direction of the DNA replication process?
  5. What is complementary base pairing?
     1. If the DNA sequence is TAG CCT GAA, then the other DNA sequence is?
  6. Where does DNA replication occur in the cell?
  7. What is the name of the enzyme that breaks the hydrogen bonds?
     1. The enzyme used is an example of what type of macromolecule?
  8. What is the name of the enzyme that adds nucleotides to the newly created DNA strand?
     1. The enzyme used is an example of what type of macromolecule?
  9. What is the function of DNA ligase?
     1. The enzyme used is an example of what type of macromolecule?
  10. What does semi-conservative replication mean?
  11. What are Okazaki fragments?
  12. What happens in DNA replication?
  13. Why is it important for DNA replication to occur?
  14. Which phase of the cell cycle does DNA replication occur?
* RNA is an example of which macromolecule?
  1. What are the subunits/parts of that monomer?
  2. What is the name of the sugar in RNA?
  3. Name all the nitrogenous bases in RNA.
  4. Draw a picture of the RNA nucleotide
* What is protein synthesis?
  1. What are the major steps involved?
  2. What organelles are involved?
  3. Do prokaryotes engage in protein synthesis?
     1. How do you know? What organelle do they possess that indicates whether they engage in protein synthesis or not?
* What are the 3 differences between DNA and RNA?
* How does RNA differ in function from DNA?
* What are the steps, in order, of protein synthesis?
  1. Draw the process.
* Label the types of RNA below.
  1. State the function of each.



* rRNA is otherwise known as?
* What is transcription?
  1. What is the role of a gene during transcription?
  2. Where does transcription occur in the cell?
  3. What types of RNA are involved?
  4. Is DNA involved?
  5. What is the name of the enzyme involved?
  6. What is produced during transcription?
  7. If the DNA sequence is TAG CCT GAA, then the RNA sequence is?
     1. What type of RNA is this?
  8. What is a codon?
     1. Give an example.
     2. How many amino acids does one codon specify?
  9. What is an exon?
  10. What is an intron?
  11. What is a promoter?
  12. What is the relationship between exons and introns?
  13. What is RNA splicing?
  14. How does transcription contribute to cell specialization?
  15. How does the environment influence the expression of genes?
* What is translation?
  1. Where does it occur in the cell?
  2. What types of RNA are involved?
  3. Is DNA involved?
  4. What is the function of translation?
  5. What is produced?
* What is an anticodon?
  1. Which RNA is an anticodon located?
  2. What is the function of an anticodon?
  3. Give an example.
* How many different amino acids exist?
  1. Give 2 examples of an amino acid.
* How many codons exist?
  1. What pattern do you recognize between the number of codons and the number of different amino acids?
  2. Are amino acids determined from a codon or anticodon?
  3. Are amino acids determined by the tRNA or mRNA?
* Name the amino acid for each of the following codons
  1. UGA
  2. CAA
  3. AUG
* What does the “STOP” codon do?
* What does the “START” codon do?
* Which type of RNA is used to code for amino acids?
* When all the amino acids are attached, what is formed?
  1. Where does this occur in the cell?
  2. Which organelle is involved?
  3. Which type of RNAs are involved?
* What is a mutation?
  1. What are the types of mutation?
     1. Provide an example of each.
     2. How does a chromosomal mutation differ from a gene mutation?
     3. Which type of mutation has the most impact on an organism?
        1. Explain why.
  2. What is an example of 2 diseases that are caused by a mutation?
  3. What is the consequence of a mutation?
  4. Does a mutation always have an effect on an organism?
     1. If not, why not?
  5. For a mutation to have an effect on an offspring, what kind of cell must a mutation occur in- a somatic or gamete?
* What happens when one of the bases in DNA undergoes a mutation?
  1. What happens to the mRNA?
  2. What happens to the amino acid produced?
  3. What happens to the protein produced?
* What accounts for the reason that specialized cells look and function differently?
  1. Is the DNA in specialized cells different throughout someone’s body?
  2. During which process- transcription or translation- would you think that the beginning steps of cell specialization occur?
     1. Explain your answer.