Unit 4: Information Study Guide

GPS Standards

DNA, RNA, & Protein Synthesis *(SB2a, SB2b; **Ch. 13**)*

Mutations (*SB2d; **Sec 14-1**)*

DNA Technology *(SB2f; **Ch. 15**)*

Questions: Answer the following questions on a SEPARATE SHEET OF PAPER

DNA/RNA Structure

1. What did each of the DNA scientists contribute to the structure or function of DNA?
2. What do DNA and RNA stand for?
3. What is the function of DNA and RNA?
4. What are the 3 parts of a typical nucleotide?
5. What are the differences between DNA and RNA in terms of: location, function, sugars, base pair rules, number of sides/strands?
6. What bases are purines and what bases are pyrimidines?
7. What type of bond holds the 2 sides of DNA together?
8. What does the term antiparallel mean in terms of DNA structure?
9. **When** does a cell do DNA replication?
10. Explain the steps of DNA replication and include the enzymes involved.
11. What are the **functions** of the 3 types of RNA?
12. How does RNA differ from DNA: sugars, # of sides, base pair rules

Protein Synthesis

13. Define transcription and translation
14. **Where** does transcription and translation occur in the cell?
15. What type of RNA has codons and what type of RNA has anticodons?
16. What are the steps of transcription? Be detailed
17. What are the steps of translation? Be detailed
18. What are the 4 levels of protein folding and what bonds are important in each level (covered back in the macromolecule notes)?

*** Make sure you understand how to use the mRNA codon chart in the book to find the names of the amino acids ***

Mutations

19. What are some causes of mutations?
20. Can a mutation in a somatic cell be passed to your offspring? Why or why not?
21. What is a point mutation?
22. What causes a frame-shift mutation and what happens to the final amino acid sequence?
23. What is a substitution mutation and what happens to the final amino acid sequence?
24. What is the difference between the 3 results of a point mutation: silent, missense, and nonsense?

DNA Technology

25. What is genetic engineering?
26. What is a genome?

27. What were the findings and applications of the Human Genome Project?
28. What are the steps of whole organism cloning?
29. What are stems cells?
30. What are the steps of recombinant DNA technology and how is it used?
31. What are genetically modified organisms?
32. How is bioremediation beneficial to the environment?
33. What is gene therapy?
34. What is gel electrophoresis and DNA fingerprinting? How are restriction enzymes used with this technology?
35. In gel electrophoresis, why is the negatively charged lead closest to the DNA in the wells?
36. Why do large DNA fragments not travel as far through the gel in gel electrophoresis?
37. What is Polymerase Chain Reaction?