

Cell Division and Genetics  
Chapter Three Study Guide (Part B)  
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1. What is the function of deoxyribonucleic acid (DNA)?
2. Where is DNA located?
3. DNA is a polymer. What chemistry term describes the polymer? What chemistry term describes the monomer?
4. What four monomers are used to construct DNA?
5. Is the DNA macromolecule described as a single strand or a double strand? Explain role of covalent bonds and hydrogen bonds in DNA's structure.
6. What is RNA?
7. What are the four nucleotides used to make RNA?
8. Is RNA a single strand or double strand?
9. What are the three forms of RNA used in protein synthesis? What is microRNA?
10. What is complementary base pairing? Significance?
11. What is semi-conservative replication? Significance?
12. How many chromosomes are there in a human cell?
13. What is a gene? What is the "nick-name" used to describe a gene?
14. How many genes are there in a human cell?
15. What type of molecule is made using the information coded in DNA?
16. How many cells make sugar and lipid molecules if DNA only encodes information to make proteins? Explain process.
17. DNA is a polymer of nucleic acids. This molecule is referred to as either chromatin or chromosome. Where within the cell cycle would you use these terms to describe the DNA molecule?
18. When a cell prepares to undergo mitosis, what must happen to its DNA?
19. How is RNA similar to DNA?
20. How is RNA different than DNA?
21. Protein is a polymer constructed from 20 amino acids (the monomers). How many nucleotides in a DNA molecule are required to "code for" one amino acid?
22. What is a base triplet? Where is it located?
23. What is a codon? Where is it located? How many nucleotides are in a codon?
24. What is an anticodon? Where is it located? How many nucleotides are in an anticodon?
25. What is a transcription? Location?
26. What is translation? Location?
27. What is a transcription factor?
28. Genes can be turned on or turned off. What does this mean? Significance?
29. Are some genes always turned on? Explain.
30. What happens after a gene is activated (i.e. turned on)?
31. Explain the steps in Protein Synthesis: You should be able to explain the steps of protein synthesis from the gene to the protein.
32. What is a polyribosome? Significance?
33. What are "chaperone" proteins?

34. What are the two different types of ribosomes found inside of our cells? Function of each ribosome type?
35. Where does protein post-translational modification occur if the protein will be exported outside of our cells?
36. What happens to proteins in the smooth endoplasmic reticulum?
37. What happens to protein in the Golgi apparatus?
38. What is the function of a transport vesicles?
39. What is the function of secretory vesicles?
40. Human cells have 46 chromosomes. If you want to reproduce a cell (i.e. make an identical copy of the cell) then each new cell must also have 46 chromosomes. Somewhere during the process the dividing cell must therefore “double” the chromosomes (i.e. 92 chromosomes). When we look at the two new cells, each new cell's DNA will a strand of the original DNA molecule and a strand of newly formed nucleotides. What is semi-conservative replication? What is complementary base pairing? What is the significance in cell division?
41. Define the function of these molecules in cell division: a) DNA helicase, b) the replication fork, c) DNA polymerase.
42. What is a mutation?
43. What is the Cell Cycle?
44. What are the two phases of the cell cycle?
45. What are the steps associated with the two phases of the cell cycle?
46. What is G zero? When and why may this occur?
47. What cell types are “locked” in G zero?
48. What is mitosis?
49. What type of cells are able to undergo mitosis?
50. What type of cells are unable to undergo mitosis?
51. What is meiosis?
52. What type of cells undergo meiosis? What are these tissues called in males vs females?
53. How many chromosomes are in a diploid cell? What do we call these cells?
54. How many chromosomes are in a haploid cell? What do we call these cells?