

Cell Division and Genetics  
Chapter Three Study Guide (Part B)  
Tortora & Derrickson

1. What is the function of deoxyribonucleic acid (DNA)?
2. Where is DNA found inside of a cell?
3. What is DNA's four nucleotides (i.e. the monomers)? How do they bond to each other?
4. What is RNA's four nucleotides? How do they bond to each other?
5. What is the role of hydrogen bonds in DNA and RNA?
6. What is complementary base pairing? Significance?
7. What is semi-conservative replication? Significance?
8. How many genes are there in the humans? Chromosomes?
9. What is a gene? What is the "nick-name" used to describe a gene?
10. What type of molecule is made using the information coded in DNA?
11. How does a cell make sugar or lipid molecule? Explain process.
12. DNA is a "double helix" molecule. DNA is described as being either "chromatin" or chromosome. Where within the cell cycle would you use these terms to describe the DNA molecule?
13. When a cell prepares to undergo mitosis, what must happen to its DNA?
14. How is RNA similar to DNA?
15. How is RNA different than DNA?
16. What three types of RNA play a role in protein synthesis? Explain
17. There are 20 amino acids (the monomers) which are used to construct all the different proteins (over 100,000) in our cells. How many nucleotides in a DNA molecule are required to "code for" a one amino acid?
18. What is a base triplet? Where is it located?
19. What is a codon? Where is it located? How many nucleotides are in a codon?
20. What is an anticodon? Where is it located? How many nucleotides are in an anticodon?
21. What happens after a gene is "activated"?
22. What is transcription? Where does it take place?
23. What is translation? Where does it take place?
24. Explain the steps in Protein Synthesis: You should be able to explain the steps of protein synthesis from the gene to the protein.
25. What is the difference in the production of "cytosol and extracellular" proteins?
26. What is a polyribosome?
27. Why are polyribosomes important?
28. What is the function of a "chaperone" protein?
29. What two types of ribosomes are found inside of our cells?
30. Where does protein post-translational modification occur for proteins that will be exported outside of our cells?
31. What happens to protein in the Golgi apparatus?
32. What is the functions of a transport and secretory vesicles?

33. In DNA replication, before a cell can divide, it must make a complete copy of its DNA so each “new cell” has an identical set of 46 chromosomes (the DNA). This process is known as “semi-conservative replication” and it is possible because of complementary base pairing. Define the function of these molecules in cell division: a) DNA helicase, b) the replication fork, c) DNA polymerase.
34. What is a mutation?
35. What is the Cell Cycle?
36. What are the two phases of the cell cycle? How are these two phases subdivided?
37. What is G zero? When and why may this occur?
38. What cell types are “locked” in G zero?
39. What is mitosis?
40. What type of cells are able to undergo mitosis?
41. What type of cells are unable to undergo mitosis?
42. What is meiosis?
43. What type of cells undergo meiosis? Males vs females?
44. How many chromosomes are in the human nucleus?
45. How many chromosomes are in a diploid cell? What do we call these cells?
46. How many chromosomes are in a haploid cell? What do we call these cells?