

BIOL1010
South Sevier High School
Chapters 9-13 Study Guide

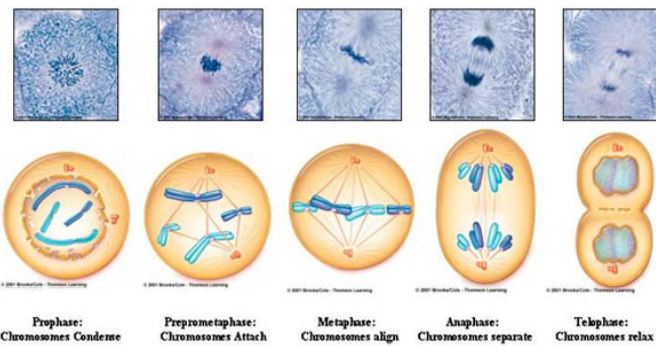
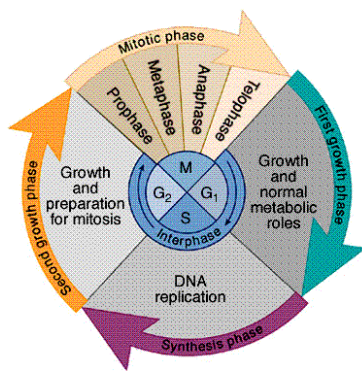
The exam covers chapters 9-13.

There are 57 questions. All are multiple choice.

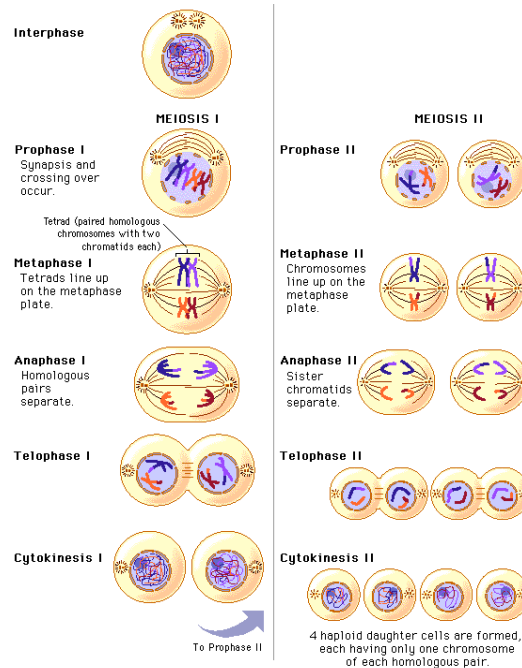
Notes, books, and study guides may NOT be used on this exam.

Study this study guide, the summaries at the end of each chapter, and all your notes. Good luck!

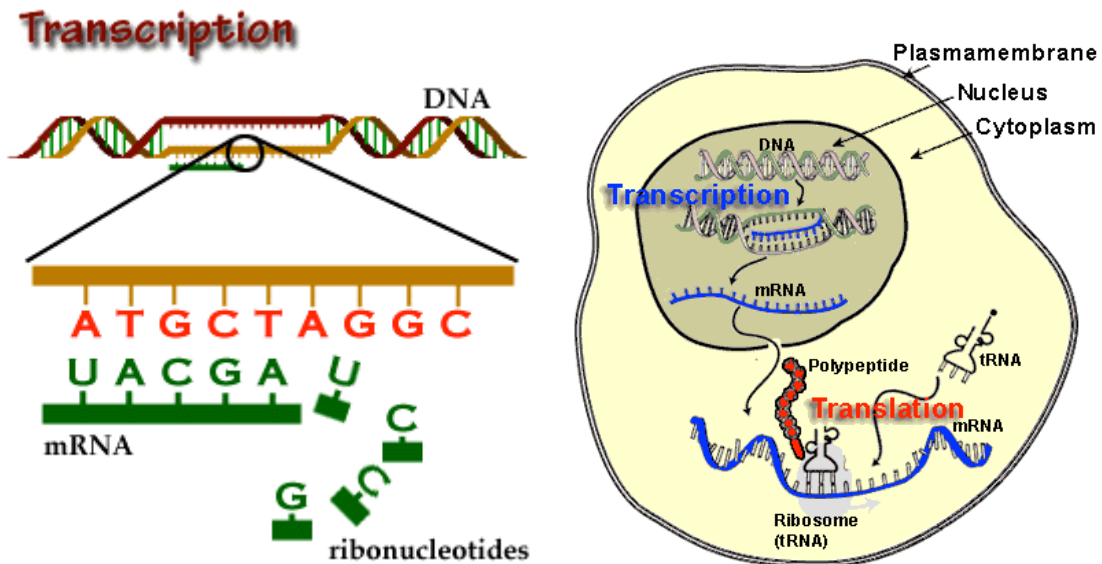
- DNA and proteins are the molecules that make up chromosomes.
- S phase (synthesis) is the part of the cell cycle where DNA copies itself.
- Under normal circumstances, mitosis will produce two identical daughter cells.
- Mitotic spindles that connect to and pull individual chromatids apart are made out of microtubules.
- The phases of mitosis are: prophase, metaphase, anaphase, telophase.
- Prophase is where the nuclear membrane dissolves, and the chromosomes become visible.
- During metaphase, the chromosomes line up on the equator of the cell, and the spindle fibers begin to attach themselves to the centromeres of the chromosomes.
- During anaphase, the spindle fibers pull the individual chromatids apart, and they begin to migrate to the poles of the cell.
- During telophase, a cleavage furrow forms, and the one cell begins to "pinch off" and divide into two daughter cells.
- The final stage of the cell cycle is where the cells completely separate from one another. This process is called cytokinesis.
- Plants go through mitosis in almost the same way animal cells do. One notable difference is that plant cells do not form a cleavage furrow, but instead form a cell plate which grows between the two new daughter cells.
- The energy for moving chromosomes comes from ATP. This is the entire cell cycle and the phases of mitosis:



- There are two kinds of reproduction. Asexual reproduction is effective in generating lots of offspring, but the offspring are genetically identical to each other. Sexual reproduction ensures genetic recombination so that offspring are genetically different from each other. Crossing over occurs during early Prophase I of Meiosis, thus creating genetic variation in offspring. The amount of mutation varies from organism to organism.
- Meiosis occurs only in sex cells and only in diploid (2n) organisms. Meiosis is a two-part process that eventually leads to the formation of four haploid (n) cells that are genetically different from one another.
- When egg and sperm combine, a new diploid zygote is formed. Haploid + Haploid = Diploid or $n + n = 2n$. All zygotes are diploid.
- This is meiosis:



17. If an organism has 10 chromosomes in its sex cells, then the organism will have 20 chromosomes in its normal body cells. Remember, the purpose of meiosis is to cut the chromosome number in half. In humans, we have 46 chromosomes in our autosomes, and 23 chromosomes in our sex cells.
18. By the way, autosomes are non-sex chromosomes and humans have 22 them. Sex chromosomes are the other 2 that determine whether we are male or female. Males have XY sex chromosomes and females have XX chromosomes. The male determines the sex of the child.
19. DNA is made up of a double-stranded helix in eukaryotic cells. The strands run anti-parallel to each other and connect via weak hydrogen bonds between the nitrogenous bases. The sides of the helix are made up of alternating sugars and phosphates. DNA is unwound by the enzyme helicase.
20. Adenine binds with Thymine and Guanine binds with Cytosine.
21. Epistasis is when one gene may mask or "overpower" the expression of another gene.
22. BB = homozygous dominant, Bb = heterozygous, bb = homozygous recessive.
23. Cdk's and cyclin control the different stages of the cell cycle. Cells spend most of their time in Interphase (G1, S, G2), and more specifically in G1.
24. Programmed cell death is called apoptosis. Cancer cells seem to get "stuck" in G1 phase where they never stop growing.
25. Different forms of a gene are called genotypes. Phenotypes are the traits that you see with your eyes. When you see a person's traits, you are seeing the phenotypic expression of their DNA.
26. Sex-linked traits are specific traits that are dependent on the sex of the parents. Some traits are carried only on the father's genes, and others on the mother.
27. Know how to do a monohybrid and a dihybrid cross, showing genotypes and phenotypes correctly.
28. RNA is a single-stranded molecule that lacks thymine. Thymine is replaced with uracil. There are three kinds of RNA. They are mRNA, tRNA, and rRNA.
29. mRNA transfers information from DNA into the cytoplasm where it attaches to a ribosome.
30. tRNA are molecules that bring amino acids to the translation site.
31. rRNA is the central component of the ribosome itself.
32. Transcription is the process of synthesizing mRNA using DNA as a template.
33. Translation is the process where mRNA is used to code for a specific amino acid, and amino acids are hooked together with peptide bonds to eventually form protein chains.
34. The following diagrams show the processes of transcription and translation:



35. A strain of virus that kills the host cell it infects are called virulent.
36. Viruses are composed of nucleic acids (either DNA or RNA) and proteins.
37. Viruses are classified in four ways. They are:
 - a. Do they contain DNA or RNA?
 - b. Is the genetic material single- or double-stranded?
 - c. Is its crystal structure simple or complex?
 - d. Does it have a protein coat or not?