

Biology Final Exam Study Guide – Level 1

Unit 6 (Cell Division, Reproduction)

1. Describe the various reasons why mitosis is important to organisms.
2. Compare and contrast asexual and sexual reproduction.
3. Provide an example of how an eukaryotic organism and a prokaryotic organism form offspring by asexual reproduction.
4. Define homologous chromosomes, gamete, diploid, haploid, fertilization.
5. If provided with an organism with a certain number of chromosomes, be able to identify the number of chromosomes in each cell during processes such as meiosis and sexual reproduction.
6. Describe the phases of meiosis and be able to identify the phase that a cell is in based upon a drawing or photograph.
7. Compare and contrast mitosis and meiosis. Be sure to mention the differing arrangements of homologous chromosomes.
8. Describe how independent assortment and fertilization they contribute to the uniqueness of potential offspring.

Unit 7 (Genetics and Inheritance)

9. Describe Mendel's work and define his four important genetic principles.
10. Distinguish between 1. genotype and phenotype; 2. homozygous (pure) and heterozygous (hybrid); and 3. dominant and recessive.
11. Create Punnett squares for complete dominance, incomplete dominance, multiple alleles and sex-linked inheritance problems. Show the possible genotypes and phenotypes of the potential offspring. Provide examples of codominance and be able to explain why they are codominance.
12. Define karyotype. Which chromosomes (in a human body cell) are the sex chromosomes?
13. Explain how nondisjunction happens and what it can cause in humans.
14. Analyze a pedigree and describe how it can be used to trace genetic disorders.

Unit 8 (DNA and RNA)

Vocabulary to be familiar with:

deoxyribonucleic acid	ribonucleic acid	nucleotide	gene
deoxyribose	ribose	nitrogen base	phosphate group
base pairing	adenine	thymine	uracil
guanine	cytosine	hydrogen bond	DNA helicase
semiconservative replication	DNA polymerase	transcription	sense strand
messenger RNA	RNA polymerase	translation	codon
transfer RNA	anticodon	start codon	stop codon
polypeptide	protein	amino acids	mutation
point mutation	frameshift mutation		
virus	viral replication (lytic and lysogenic)		

15. Explain the structural and functional differences between DNA and RNA.
16. Explain why base pairing is important to the function of a cell.
17. Describe the steps of DNA replication, explaining when/why it happens, explaining why it is called a semi-conservative process, and incorporating the essential enzymes that aid in the process.
18. Describe the steps of protein synthesis, starting with DNA in the nucleus and ending with a protein completed and heading off to the Golgi apparatus for repackaging. Be sure to include the detailed steps of transcription and translation in your response, along with the associated enzymes. Be able to transcribe and translate a given DNA sequence.

19. Describe why point can *sometimes* cause changes in the amino acid sequence of a protein while frameshift mutations *often* cause changes. Be able to transcribe DNA sequences that have been mutated and translate their mRNA into a protein.
20. Explain the steps of lytic and lysogenic viral replication.

Unit 9 (Evolution)

21. Define evolution and describe the three main principles of Darwinian Evolution.
22. Explain each category of evidence for evolution.
23. Define and provide an example of a homologous structure.
24. Define and provide an example of a vestigial structure.
25. Define natural selection and explain the different types of natural selection (directional, stabilizing, sexual, disruptive) using examples.
26. Analyze an evolutionary tree.
27. Explain genetic drift (bottleneck effect and founder effect) and gene flow.
28. Define the term species and explain how speciation can occur.
29. Define biodiversity and provide examples of how evolution affects biodiversity.

Unit 10 (Taxonomy)

30. Identify who established the current system of taxonomy and define binomial nomenclature.
31. List the categories of taxonomy (taxa) in proper order.
32. List the criteria used by modern taxonomists to put organisms into the correct categories (I gave you a list of 10 criteria, remember that the best are the most modern, especially DNA).
33. Name and define the four main types of heterotrophic nutrition.
34. Name, define, and provide a specific example of the types of symbiosis.
35. Name and define the two main types of autotrophic nutrition.
36. Identify the six kingdoms of life and for each kingdom be able to state the:
 - type of cell (eukaryotic vs. prokaryotic)
 - mode of nutrition (autotrophic vs. heterotrophic)
 - number of cells (unicellular, multicellular) (*I'm not worried about colonial*)
 - mode of reproduction (asexual, sexual)
 - important cell structures (cell walls?, chloroplasts?, centrioles?, etc.)
 - know some examples of organisms in each kingdom
37. Describe the main difference between the *Eubacteria* and *Archaeobacteria*.
38. Describe the ways protists move and obtain food (Hint: *Euglena*, *Paramecium*, *Amoeba*).

Unit 11 (Ecology)

39. Define the terms: ecosystem, biotic, abiotic, and trophic level.
40. Draw and label an energy pyramid and explain why it is useful in understanding the transfer of energy in an ecosystem.
41. Construct a food web or analyze a food web already prepared. Label the producers, primary consumers, secondary consumers, higher order consumers, and decomposers.
42. Draw, label, and explain the three biogeochemical cycles (carbon, water, nitrogen).
43. Define the term population and describe the factors that could increase or decrease a population.
44. Analyze a population graph, especially one involving a predator and prey on the same graph.
45. Define biotic potential and describe why an organism such as a field mouse does not typically reach its biotic potential.

(There will not be any questions regarding our anatomy mini-units.)