

## UCS SECOND SEMESTER BIOLOGY STUDY GUIDE 2015-2016

On the exam, you will be expected to be able to read scientific data from a diagram, chart or graph.

### CELL DIVISION: Chapter 8

1. Define asexual reproduction and sexual reproduction.
2. How do the daughter cells produced from asexual reproduction compare to the parent cell?
3. How do the daughter cells produced from sexual reproduction compare to the parent cell?
4. What types of cells result from the process of **mitosis**?
5. What types of cells result from the process of **meiosis**?
6. How does a fertilized egg become an organism made of many cells?
7. Explain homologous chromosomes.
8. Compare the end result of mitosis and meiosis.
9. What are the results of crossing-over?
10. Draw a diagram of crossing-over.
11. Draw the phases of mitosis in the correct sequence.

### DNA, REPLICATION, TRANSCRIPTION & TRANSLATION: Chapter 10

12. What does DNA have the “code” for?
13. Explain the structure of DNA.
14. Explain the process of DNA replication.
15. If given codon chart, be able to determine DNA sequence, mRNA sequence, or amino acid sequence when given DNA sequence.
16. Why do we say the codon chart is “universal”?
17. List **3 types of effects** mutations can have on an organism and **explain** how each affects the protein produced and **why**.
18. State **where** transcription occurs in a cell and **why** cells perform this process.
19. **Draw** and **label** a diagram of translation (include the following in your diagram: ribosome mRNA, tRNA, amino acid, protein (polypeptide)).
20. State **where** translation occurs in a cell and **why** cells perform this process.
21. How is DNA transcription related to DNA translation?
22. Explain the step-by-step process of transcription and translation.

### GENETICS: Chapters 9 & 12

23. Be able to do a Punnett square and list genotype and phenotype. Ex: BB x bb, Bb x Bb, BB x bb
24. What is homozygous?
25. What is heterozygous?
26. What is a karyotype **AND** what is it used for?
27. What is a genetic mutation?
28. What happens when a mutation occurs in a sex cell?
29. Draw a diagram of a homologous pair of chromosomes with homozygous alleles.
30. Draw a diagram of a homologous pair of chromosomes with heterozygous alleles.
31. Explain codominance and give 2 examples.
32. Explain Mendel’s Law of Segregation and be able to identify an example.
33. Explain Mendel’s Law of Independent Assortment and be able to identify an example.
34. What causes Down Syndrome and be able to identify a karyotype of a person with it? How many chromosome will you see in the karyotype?
35. Draw a Punnett square for 2 heterozygous parents and list the genotypes and phenotypes produced.

36. While looking at a Punnett square, be able to determine if a trait is sex-linked dominant or recessive.
37. In offspring produced by sexual reproduction, why don't all offspring from the same 2 parents look exactly alike?
38. What is a frame-shift mutation and what is the effect it has on a protein?
39. What is a point mutation and what is the effect it has on a protein?
40. Using a pedigree, how can you determine if a trait is sex-linked or autosomal?
41. Using a pedigree, how can you determine if a trait is dominant or recessive?
42. How can cancer spread throughout the body from a mutation in one cell?
43. Is it possible for a female to inherit a sex-linked trait?
44. How do parents transmit traits to their offspring?
45. Define each of the following and be able to interpret Punnett square results from each including phenotype ratios and genotype ratios.
  - recessive traits
  - dominant traits
  - sex-linked traits
  - polygenic traits
46. How are the following traits inherited: hemophilia, colorblindness, PKU, Sickle cell anemia
47. What environmental factors can cause mutations?

**CLASSIFICATION: Chapter 17**

48. Be able to read a cladogram and determine how closely related organisms are.

**EVOLUTION: Chapters 15 & 16**

49. Explain how each of the following pieces of evidence supports the theory of evolution: homologous structures, fossils, chemicals (DNA), and embryonic development.
50. Thoroughly explain natural selection.
51. What determines whether a mutation in a population will increase or decrease in frequency?
52. What are the advantages and disadvantages of asexual reproduction?
53. What are the advantages and disadvantages of sexual reproduction?
54. What 3 things contribute to increased genetic variation in offspring?
55. Explain Darwin's study of the beaks of finches and what he concluded.
56. New species develop over time due to the environment acting by natural selection on phenotypes. What must occur initially for this process to begin?
57. Does natural selection act on the phenotypes of individuals or populations?
58. If looking at the DNA of several organisms, how can you tell if they are or are not closely related?
59. What determines whether a trait will cause an organism to be biologically "fit"?