

ENVIRONMENTAL SCIENCE
BSC 1050

Part II Objectives

Genetics (Chapter 3, notes)

1. Give the major genetic contributions of Mendel and Morgan.
2. Describe how a molecule of DNA is constructed showing the A-T and G-C base pairs. Tell why it is called a "double helix."
3. Describe how a molecule of DNA duplicates itself and forms two identical molecules.
4. Explain how DNA directs the synthesis, using RNA, of one complete protein molecule.
5. Distinguish between a chromosome, a DNA molecule, and a gene.
6. Give the total number of chromosomes in a human body cell and a human germ cell.
7. Explain why the DNA molecules in two clones of a parent plant would be identical.
8. Tell the difference between a dominant trait and a recessive trait.
9. Explain the "gene pool" concept in genetics and tell why nature eliminates harmful genes from this pool.
10. Define natural selection according to Darwin.
11. Explain the difference between gradualism evolution and punctuated equilibrium evolution by using the horse as an example.
12. Define adaptation and use the peppered moth in England as an example of how color changes may occur.
13. Tell how it is determined biologically who the most fit is in "survival of the fittest."
14. Explain the difference between territoriality and social dominance and tell why both of these benefit the species.
15. Give two ways that mutations occur.

16. Tell what is meant by "mutations just happen."
17. Describe PKU as to its cause, effects, and treatment. Since it is caused by a recessive gene, give the genotype of a child with PKU.
18. Explain why, today, the number of genes for PKU is increasing in the human gene pool.
19. Give a specific example of how both genetics and the environment work together to determine how an organism looks (its phenotype).
20. Explain the relationship between sickle cell anemia and malaria by giving the cause and effect of each.
21. Tell how sickle cell traits may be determined by a simple blood test.
22. Define balanced polymorphism.
23. Define species and give the species to which man belongs.
24. Describe an example of how speciation may occur by using a cave as a barrier.

Extinction of Species (Chapter 5)

25. Name some modern day animals that are extinct and some that are near extinction.
26. Give some reasons why we should care if a species becomes extinct.
27. List some of the major factors leading to extinction and give examples of each.
28. Tell how many of the species that have ever lived on the earth are now extinct.
29. Explain why blind fish living in a cave are described as "extremely specialized," show "regressive evolution" and possess "compensatory traits."
30. Explain the difference between convergent and divergent evolution and tell which is an example of speciation.
31. Tell what the Endangered Species Act says.
32. Explain what is meant by "acquired traits cannot be genetically passed on."
33. Give examples of and tell the difference between a biological and a physical barrier.

34. Using a neutral trait like ear lobes as an example, explain why there is no selection for one gene over the other and why the gene frequency does not change from one generation to the next.
35. Give several constant and one variable physical environmental factor in a cave.
36. Give the status of the American Chestnut Tree and tell why this is so.
37. Give an example of how DDT may cause birds to become extinct.
38. Tell why most mutations are harmful rather than beneficial.
39. Explain the "Critical Level" concept and give 5 reasons why it occurs.
40. Define inbreeding and tell why this would eventually cause reduced populations.
41. Tell what Drosophila are and why they are so important in genetic studies.

Populations (Chapter 4)

42. Explain the effect each of the following would have on a population:
 - biotic potential
 - carrying capacity
 - limiting factors
 - environmental resistance
43. List several limiting factors which cause a population curve to level off and remain in equilibrium.
44. Construct a graph which illustrates Malthus' predictions relating to population and food increase. Explain the difference between arithmetic and geometric increase.
45. Explain why a top carnivore in a food chain may harvest more energy from an acre of plants if the food chain is short, not long.
46. Using Mexico as an example, tell why increasing food alone is not the solution to feeding people suffering from undernourishment.
47. List several reasons which have caused a decline in the birthrate in the USA.
48. Tell why the growth curve of the human population is somewhat different from the curve for Drosophila and field mice.

49. Give the major cause of death for most of the flies in a test tube until all eventually die.
50. Describe various methods of birth control and arrange them in order according to their effectiveness.
51. Give the major cause of concern when deciding to have a vasectomy or a tubal ligation.
52. Tell how a vasectomy differs from castration.
53. Give the status of abortion in the USA today. Tell why it must be considered as one method of population control.
54. Give the views of ZPG (Zero Population Growth) and Planned Parenthood relating to family size.
55. Discuss the best overall possible solution to the world's population explosion.