

BIOL1010
South Sevier High School
Exam 4 Chapters 15-19 Study Guide

The format of this test is as follows:

- A. 75 multiple-choice questions
 - B. Six Hardy-Weinberg problems, very similar to the take-home assignment.
 - C. Mr. Brady got 100% on this test, so it has to be easy.
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1. 99% of all the species that have every lived on the Earth since the beginning of time are now gone.
 2. Define natural selection. What is the difference between natural selection and artificial selection?
 3. The Theory of Catastrophism states that the Earth has undergone many large cataclysmic events that caused mass extinctions.
 4. Plato said that all life forms on Earth are imperfect forms of perfect beings.
 5. Aristotle's *scala naturae* states that life is like a ladder or a chain, with simplest life on the bottom and advanced life on the top.
 6. Lamarck theorized that giraffes had long necks because they stretched their necks to reach food high in the trees, and then that trait was passed on to offspring.
 7. Darwin's ideas for natural selection came mainly from observing finches and tortoises during his visit to the Galapagos Islands.
 8. Intermediate fossils show the mixtures of traits between two different species. An example would be Archaeopteryx, which showed some bird-like characteristics, and some reptile-like characteristics.
 9. Sexual reproduction ensures genetic recombination. This recombination occurs during meiosis (Prophase I) and fertilization.
 10. The five conditions of the Hardy-Weinberg that must be met are:
 - a. Mating is random.
 - b. Population size is large.
 - c. This is no migration between populations.
 - d. Mutations are ignored.
 - e. Natural selection does not affect the alleles under consideration.
 11. When the Hardy-Weinberg equilibrium is at equilibrium (.33,.33,.33), then no evolution is occurring.
 12. The Founder Effect occurs when a population is very very small, and only a few individuals survive causing genetic drift.
 13. The Hardy-Weinberg equilibrium does not work well in humans because mating is not completely random.
 14. Know how to key out an item on a dichotomous key.
 15. Prezygotic isolation means that two organisms might be capable of reproducing, but physically are unable to (e.g. reproductive parts don't fit together, size issues, etc.).
 16. Postzygotic isolation occurs after fertilization, and prevents the embryo from developing properly (e.g. hybrid species mating).
 17. Temporal reproduction isolation mechanisms include animals going into heat at the wrong time so that reproduction does not occur.
 18. Speciation is when one species transforms into another species over a long period of time.
 19. Allopatric speciation (also called geographic speciation) is the physical separation individuals. Examples include separation because of a fence, road, mountain, parking lot, lake, river, or ocean.
 20. A zygote is the first cell the results when it gets fertilized by a sperm.
 21. The first multicellular organisms evolved approximately 1.4 billion years ago.
 22. Oxygen was not present in Earth's early atmosphere. The early atmosphere would have contained high levels of hydrogen, carbon dioxide, nitrogen, and water vapor.
 23. Fossils of prokaryotic organisms date back to approximately 3.8 billion years ago.
 24. The current exception age of the Earth's formation is about 4.6 billion years ago.
 25. Photosynthetic cyanobacteria (stromatolites) released oxygen into the ancient atmosphere.
 26. There have been five (5) recorded mass extinctions on the Earth. Some of the suspected causes include global climate change, glaciations, continental drift, massive volcanic eruptions, and asteroid collisions.
 27. The first cells gave rise to the first types of primitive bacteria and archaea.
 28. The Carboniferous Period (Pennsylvanian and Mississippian) is where modern fossil fuels originated (from large portions of the Earth being covered in warm, wet, swamps and marshes).
 29. Remember: Do Kings Play Chess On Fluffy Green Sofas? or Did Kim Parsons Come Over For Green Skittles?
 30. Archaea and Eukarya are more closely related than Eukarya and Bacteria.
 31.

Domain	Kingdom
Archaea	Archaeobacteria
Bacteria	Eubacteria
Eukarya	Protista, Fungi, Plantae, Animalia

32. Scientific names are mainly written in Latin, a dead language. They are written binomially with the first letter of the first word uppercase, and the first letter of the second word lowercase. Scientific names must be underlined or *italicized*.
33. Taxonomy is a branch of Biology that deals with the naming, identifying, and classification of organisms.
34. Animals are multicellular and heterotrophic by ingestion.
35. Plants are multicellular and photoautotrophic.
36. Fungi are unicellular or multicellular and heterotrophic by absorption.
37. Protista are unicellular or multicellular, and are photoautotrophic or heterotrophic by absorption or ingestion.
38. In some cases, evolution can happen very quickly. Examples include antibiotic resistance and the silversword. This type of evolution is called Punctuated Evolution.
39. Intelligent Design is an alternative view that sees life on the Earth coming from an intelligent agent or a higher power. Most consider it to be creationism. The biggest downfall of ID is that its premises are not scientifically testable.
40. Protista is the “catch-all” kingdom.
41. Scientists have classified approximately 2 million species.
42. Archaea are also called the Extremophiles (lovers of acid, heat, salt, etc.).
43. Crosses between different species produce infertile offspring (if there is an offspring produced at all).
44. If similarities between two structures in different organisms reflect common ancestry, then these structures are said to homologous (bones in a bird wing and bat wing).
45. If similarities between two structures in different organisms do not reflect common ancestry, then these structures are said to analogous (insect wing and a bird wing).
46. Vestigial structures are structures that do not seem to have any function (e.g. appendix, wisdom teeth, mammae on males, etc.).
47. Polyploidy is where an organism has multiple copies of chromosomes (more than the regular diploid). Plants are capable of producing polyploid organisms.
48. Gradualism means that evolution usually occurs steadily over very long periods of time (the opposite of punctuated evolution).
49. The Devonian period is often known as the “age of fishes”.
50. The first reptiles appeared during the Carboniferous Period.
51. Flowering plants and the first true mammals appear during the Jurassic Period.
52. The Cretaceous Period marked the destruction of the dinosaurs due to an asteroid impact.
53. *Homo sapiens* appear in the Quaternary Period.
54. Humans and chimpanzees share a common ancestry. Our DNA is 98.6% identical (humans 46 chromosomes and chimps 48 chromosomes).
55. *Homo sapiens* appear in the fossil record about 200,000 years ago in East Africa.
56. Multicellular organisms became super abundant after oxygen appears in the atmosphere.
57. Modern life evolved during the Cenozoic Era. The Cenozoic Era is also known as the “age of mammals”.
58. Sympatric speciation is reproductive isolation without any physical separation of the subpopulation. This usually occurs when a species becomes genetically isolated (meaning they can have sex, but cannot produce a fertile offspring).
59. Use the following information to solve the Hardy-Weinberg problems:

Genotype:	AA	Aa	aa
Frequency	p^2	$2pq$	q^2

Hardy-Weinberg equation: $p^2+2pq+q^2=1$

Let N_{AA} = # of individuals with AA.
 Let N_{Aa} = # of heterozygous individuals Aa.
 Let N_{aa} = # of individuals with aa.
 $N_{AA}+N_{Aa}+N_{aa} = N$ (Total in the population), $2N$ because diploid.
 Let p = the frequency of A.
 Let q = the frequency of a.
 $p + q = 1$

Equation $p = \frac{2N_{AA} + N_{Aa}}{2N}$

Equation $q = \frac{2N_{Aa} + N_{aa}}{2N}$