

Biology 370 – Study Questions 1-1

1. Some would argue that the “Ladder of Life” or “Great Chain of Being” proposed by Aristotle and other early natural philosophers is “teleological”. What does this mean?
2. Phenomena like this are often observed: A blacksmith’s son often has large muscles even before he has taken up his father’s profession. Explain this phenomenon in terms of “inheritance of acquired characters.”
3. Phenomena like this are often observed: A blacksmith’s son often has large muscles even before he has taken up his father’s profession. Explain this phenomenon in terms of modern genetic ideas of inheritance.
4. Contrast the teleological model of the evolution of humans with the Darwinian model.
5. Describe how Plato’s ideas on the nature of reality, and how to know the nature of reality contrast with modern ideas.
6. Compare “essentialist” or “idealist” view of variation within species, at a single point in time, with the “evolutionist” view.
7. Many biologists of the 1800s were “natural theologians.” What does this mean?
8. Describe the hierarchical classification system of Linnaeus. How is it tree-like?
9. Describe a hierarchical classification system used today (inside or outside biology), other than the Linnaean system.
10. In what ways were Darwin’s model for evolution and LaMarck’s model for evolution similar?
11. In what ways were Darwin’s model for evolution and LaMarck’s model for evolution different?
12. What is “uniformitarianism”? Why is it an important part of science?
13. Geologists were the first to use uniformitarian principles to explain natural processes. What sorts of observations forced a major conclusion that contrasted with Genesis of the Bible?
14. How does the selective breeding of plants and animals to produce useful or novel breeds and varieties support the idea of evolution by natural selection?
15. How does the extreme potential for plants and animals to multiply support the idea of evolution by natural selection?
16. Darwin wrote: “If it could be demonstrated that any complex organ existed, which could not possibly have been formed by numerous, successive, slight modifications, my theory would absolutely break down.” Why is this true?
17. Darwin wrote: “If it could be proved that any part of the structure of any one species had been formed for the exclusive good of another species, it would annihilate my theory, for such could not have been produced through natural selection.” Why can’t such structures be produced by natural selection?
18. August Weissmann observed the reproductive anatomy of organisms and argued that the inheritance of acquired characters could not be true. What observations did he make that supported his arguments.
19. August Weissmann did experiments that helped show that the inheritance of acquired characteristics was not a valid idea. How did he do this?
20. What is orthogenesis? Where did the idea come from? Why is orthogenesis no longer a part of evolutionary biology.
21. What about Mendel's work seemed to contradict Darwin's ideas about evolution?

22. Who were the biometricians and what did they study?
23. What discoveries allowed the ideas of the mutationists and biometricians to be synthesized?
24. Describe how polygenic inheritance can account for the range of skin colors in humans.
25. What was Dobzhansky's contribution to the evolutionary synthesis?
26. What does the statement "The phenotype is a product of the genotype and environment" mean? Give an example.
27. What does the statement "Genes are particulate, but their effects are combined in the organism" mean? Give an example.
28. What does the statement "Evolutionary change is a population process" mean?