

SOLUTIONS TO THE STUDY GUIDE FOR MODULE #9

1. a. The immutability of species – The idea that each individual species on the planet was specially created by God and could never fundamentally change
 - b. Microevolution – The theory that natural selection can, over time, take an organism and transform it into a more specialized species of that organism.
 - c. Macroevolution – The hypothesis that processes similar to those at work in microevolution can, over eons of time, transform an organism into a completely different kind of organism
 - d. Strata – Distinct layers of rock
 - e. Fossils – Preserved remains of once-living organisms
 - f. Paleontology – The study of fossils
 - g. Structural homology – The study of similar structures in different species
2. He did most of his research while he was on board the *HMS Beagle*. True, it took him years after leaving the *Beagle* before publishing, but that was mostly because of his wife's urgings not to publish. Although he made most of his *observations* that led to his theory on the Galapagos archipelago, it was on the ship that he did most of the *work*.
 3. No. Stories like that are not true.
 4. Malthus believed in a constant struggle for survival. Without this idea of a constant struggle, Darwin would have never come up with the concept of natural selection.
 5. Lyell came up with the idea that the present is the key to the past. He thought that the entire geological column could be explained by referring to the same processes that we see happening today. Darwin basically took that same idea and applied it to his hypothesis. He said that the variation we see in nature is the result of the variations that occur in reproduction (which we see today) operating over eons of time.
 6. Darwin dispelled the idea of the immutability of the species. By showing the evidence for microevolution, Darwin was able to show that species did change.
 7. To go from a horse to a giraffe, there would need to be a lot added to the genetic code. Thus, this scenario is an example of macroevolution.
 8. The fish remain fish; they have just varied their phenotype. Thus, this is variation within the genetic code, which is an example of microevolution.
 9. In microevolution, the same genetic code exists throughout the change. The changes that occur are simply the result of variation within that genetic code. In order for macroevolution to occur, information must be added to the genetic code, essentially creating a new genetic code.

10. The data sets and their relation to macroevolution are given in the table below:

Data Set	Summary
The geological column	<u>This data is inconclusive as far as macroevolution is concerned.</u> If you believe that the geological column was formed according to the speculations of Lyell, it is evidence for macroevolution because it shows that life forms early in earth's history were simple and gradually got more complex. If you believe that the geological column was formed by natural catastrophe, then it is evidence against macroevolution. Since geologists have seen rock strata formed each way, it is impossible to tell which belief is scientifically correct.
The fossil record	<u>This data is strong evidence against macroevolution.</u> There are no clear intermediate links in the fossil record. The very few that macroevolutionists can produce are so similar to one of the two species they supposedly link, it is more scientifically sound to consider them a part of that species.
Structural homology	<u>This data is strong evidence against macroevolution.</u> The similar structures are not a result of inheritance from a common ancestor, because the similar structures are determined by quite different genes.
Molecular biology	<u>This data is strong evidence against macroevolution.</u> The vast majority of the data show no evolutionary patterns in the sequences of amino acids of common proteins.

11. Australopithecus afarensis is supposed to be an intermediate link between man and ape. However, every bone that we have found of this creature indicates it is an ape. Thus, it is safest to assume that it is an ape. Archaeopteryx is supposed to link birds and reptiles, but once again the fossils tell us it is just a bird.

12. The Cambrian Explosion refers to the fact that every major animal phylum in creation can be found in Cambrian rock. Thus, it is like there was an "explosion" of life. It presents two problems for macroevolution: (1) There is no way macroevolutionists can understand how macroevolution proceeded so quickly during those times. (2) There are just no intermediate links. In some parts of the geological column, you can find highly-questionable intermediate links, but they are at least something. In Cambrian rock, it just looks like the fossils appeared suddenly.

13. A bacterium can become resistant to antibiotics by conjugation, transformation, transduction, or mutation.

14. No information is added. In fact, in those cases studied, information is destroyed, leading to non-working or less efficient systems that just happen to make the bacterium resistant.

15. The most similar protein will be the one with the fewest difference in sequence. The protein in (a) has 5 amino acids different from the protein of interest, the protein in (b) has 4 differences and the one in (c) has 3. Thus, the protein in (c) is most similar.

16. A bacterium's cytochrome C should resemble a yeast's more than a kangaroo's does, because, according to evolutionists, the yeast evolved rather early after the bacterium, but the kangaroo came much, much later. In fact, however, the bacterium's cytochrome C sequence is *more similar to the kangaroo's* than it is to the yeast's!

17. Neo-Darwinism hoped to provide a mechanism by which information could be added to the genetic code of an organism. This was something Darwin's original hypothesis could not do.

18. Punctuated equilibrium attempts to explain away the fact that the fossil record is devoid of any real intermediate links.

19. He would say that since the transition from species to species takes such a short amount of time, there is virtually no chance of an intermediate link being fossilized.

20. Structural homology and molecular biology still say that macroevolution (even by punctuated equilibrium) could not have happened.