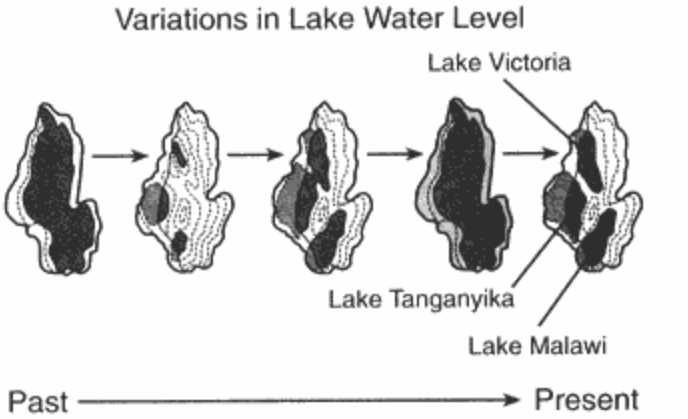
Name:_____ **Date:**_____

Evolution Review

1. Base your answer to the following question on the information below and on your knowledge of biology.

   The three great lakes in Africa (Victoria, Tanganyika, and Malawi) contain a greater number of fish species than any other lakes in the world. Lake Malawi alone has 200 species of cichlid fish. The diversity of cichlid species in these African lakes could have been caused by changes in water level over thousands of years. According to one hypothesis, at one time the three lakes were connected as one large lake and all the cichlids could interbreed. When the water level fell, groups of cichlids were isolated in smaller lakes as shown in the diagram. Over time, the groups of cichlids developed genetic differences. When the water levels rose again, the isolated populations were brought back into contact. Due to significant genetic differences, these populations were unable to interbreed. Variations in water level over thousands of years resulted in today's diversity of cich-lid species.



   Each cichlid population is genetically different from the other cichlid populations. State *one* reason for these genetic differences.

2. Explain the difference between homologous and analogous structures citing which is misleading and which demonstrates sharing of a common ancestor AND an example of both.

3. Explain why a mutation that occurs in a body cell will *not* contribute to the evolution of a species.

4. Suggest *one* way that doctors or patients can help to reduce the chances of bacteria becoming resistant to an antibiotic.

5. Base your answer to the following question on the information provided and on your knowledge of biology.

A student observed the physical characteristics of seven organisms and prepared the data table below. One of the student's classmates sorted the seven organisms into two groups as shown below.

Organism Comparison

Organism	Internal Skeleton Present	Legs Present	Wings Present	Fur Present	Moist Body Covering Present
Earthworm	no	no	no	no	yes
Fish	yes	no	no	no	yes
Fly	no	yes	yes	no	no
Gorilla	yes	yes	no	yes	no
Jellyfish	no	no	no	no	yes
Parrot	yes	yes	yes	no	no
Snake	yes	no	no	no	no

Group 1	Group 2
fly parrot	earthworm gorilla snake fish jellyfish

Fish and snakes are very different organisms, yet they have many similarities. Provide a biological explanation for the fact that fish and snakes have so many characteristics in common.

Base your answers to questions **6** through **8** on the information below and on your knowledge of biology.

EVOLUTION OF THE ELEPHANT

Today's elephants are the result of a long process of evolution. Over millions of years, small changes were passed from one generation to the next. The first fossil elephant species were small, but over time, they increased both in size and weight. The three species alive today are the sole survivors of a once much more widespread group.

Source: www.factmonster.com/dk/science/encyclopedia/evolution.html

6. Explain why it took so long for elephants to evolve in this way, while insects and bacteria can undergo evolution much more rapidly.

7. Provide a possible explanation for the increase in size and weight of the elephants over millions of years.

8. Explain why some elephant species did not survive.

9. Base your answer to the following question on the information below and on your knowledge of biology.

Evolution leads to changes in how frequently certain traits appear in a population. Explain the importance of the presence of variations within a population.

Base your answers to questions **10** through **12** on the information below and on your knowledge of biology.

Rabbits eat plants and in turn are eaten by predators such as foxes and wolves. A population of rabbits is found in which a few have a genetic trait that gives them much better than average leg strength

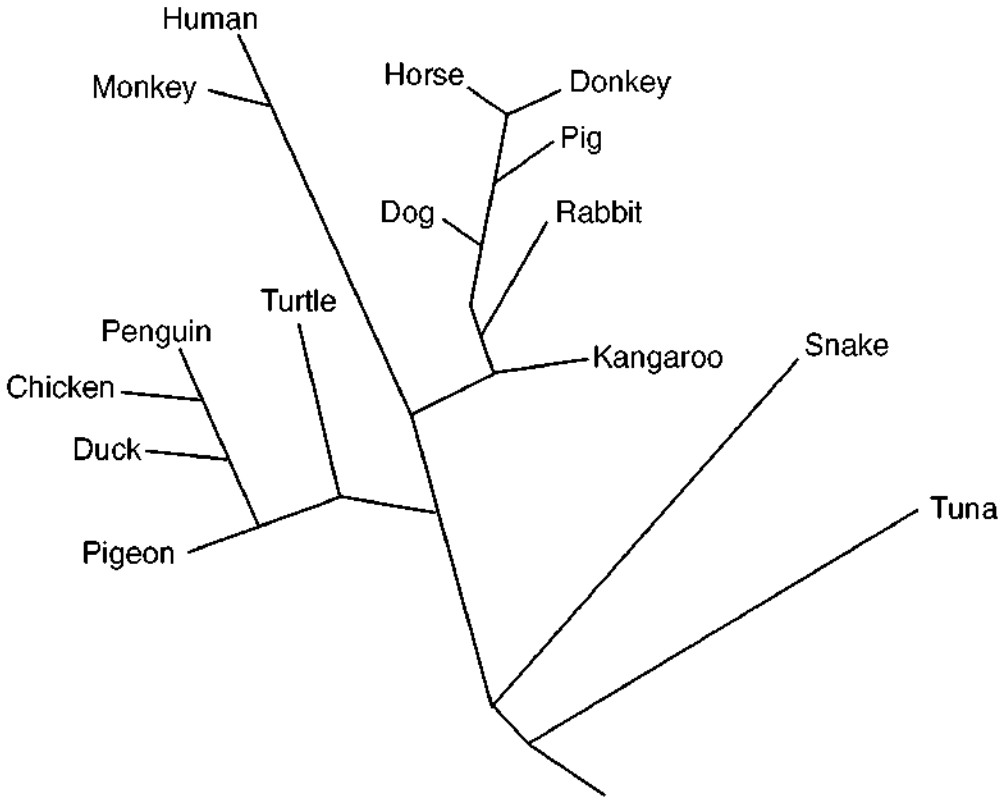
10. Predict how the frequency of the trait for above average leg strength would be expected to change in the population over time. Explain your prediction.

11. State what is likely to happen to the rabbits in the population that do *not* have the trait for above average leg strength.

12. It was later discovered that the rabbits born with the trait for above average leg strength also inherited the trait for poor eyesight. Taking into account this new information, explain how your predictions would change. Support your answer.

Base your answers to questions **13** through **15** on the information below and on your knowledge of biology.

Based on their analysis of the differences in amino acid sequences of one kind of protein, scientists prepared the evolutionary tree shown below.



13. According to this diagram, is the pig more closely related to the dog or the kangaroo? Justify your answer.

14. Older systems of classification always placed penguins, chickens, ducks, and pigeons in the bird group and turtles and snakes in the reptile group. Does this diagram support the older system of classification? Explain your answer.

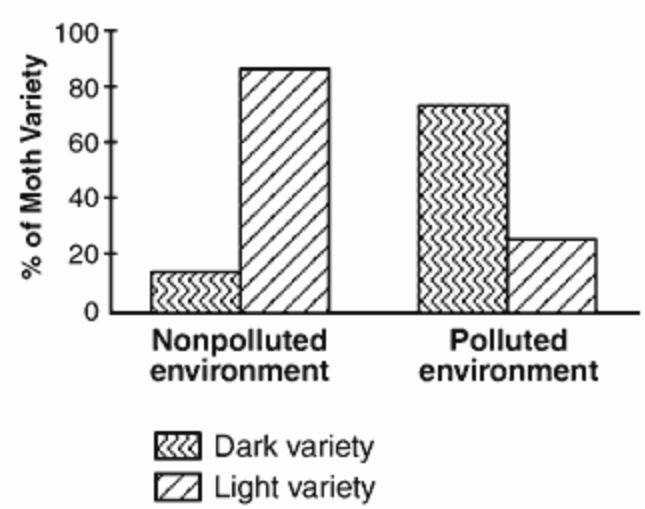
15. According to this diagram, the DNA of which pair of organisms would show the greatest similarity?

A) penguin and turtle
B) horse and donkey
C) snake and tuna
D) turtle and rabbit

Base your answers to questions **16** through **18** on the information below and on your knowledge of biology.

Color in peppered moths is controlled by genes. A light-colored variety and a dark-colored variety of a peppered moth species exist in nature. The moths often rest on tree trunks, and several different species of birds are predators of this moth.

Before industrialization in England, the light-colored variety was much more abundant than the dark-colored variety and evidence indicates that many tree trunks at that time were covered with light-colored lichens. Later, industrialization developed and brought pollution, which killed the lichens, leaving the tree trunks covered with dark-colored soot. The results of a study made in England are shown below.



16. Which conclusion can best be drawn from the information given?

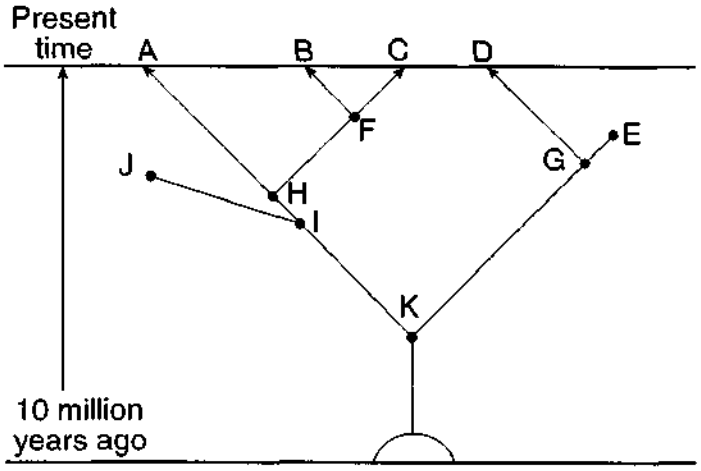
    A) The trait for dark coloration better suits the peppered moth for survival in non-polluted environments.
    B) The trait for light coloration better suits the peppered moth for survival in polluted environments.
    C) The variation of color in the peppered moth has no influence on survival of the moth.
    D) A given trait may be a favorable adaptation in one environment, but not in another environment.

17. The percentage of light-colored moths in the polluted environment was closest to

    A) 16 B) 24 C) 42 D) 76

18. During the past few decades, air pollution control laws in many areas of England greatly limited the soot and other air pollutants coming from the burning of coal. State *one* way the decrease in soot and other air pollutants will most likely influence the survival of the light-colored variety of peppered moth.

Base your answers to questions **19** through **21** on the diagram below. The diagram shows an interpretation of relationships based on evolutionary theory. The letters represent different species.



19. Explain why species *B* and *C* are more closely related than species *A* and *C* are.

20. The diagram indicates that a common ancestor for species *C* and *E* is species

A) *F* B) *G* C) *H* D) *K*

21. Which species are *least* likely to be vital parts of a present-day ecosystem?

A) *A* and *E* B) *C* and *D* C) *E* and *J* D) *B* and *F*