Evolution Review Questions

Name _____

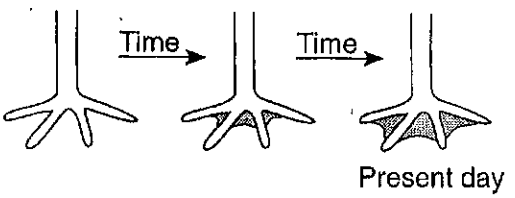
Answer Sheet

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____
31. _____
32. _____
33. _____
34. _____
35. _____
36. _____
37. _____
38. _____
39. _____
40. _____
41. _____
42. _____
43. _____

Evolution Review Questions

1. Some behaviors such as mating and caring for young are genetically determined in certain species of birds. The presence of these behaviors is most likely due to the fact that
   (1) birds do not have the ability to learn
   (2) individual birds need to learn to survive and reproduce
   (3) these behaviors helped birds to survive in the past
   (4) within their lifetimes, birds developed these behaviors

2. The changes in foot structure in a bird population over many generations are shown in the diagram below.



   These changes can best be explained by the concept of
   (1) evolution
   (2) extinction
   (3) stable gene frequencies
   (4) use and disuse

3. Evolution refers to change over a long period of time in
   (1) a fossil
   (2) a population
   (3) a rock
   (4) an embryo

4. The theory of biological evolution includes the concept that
   (1) species of organisms found on Earth today have adaptations not always found in earlier species
   (2) fossils are the remains of present-day species and were all formed at the same time
   (3) individuals may acquire physical characteristics after birth and pass these acquired characteristics on to their offspring.
   (4) the smallest organisms are always eliminated by the larger organisms within the ecosystem

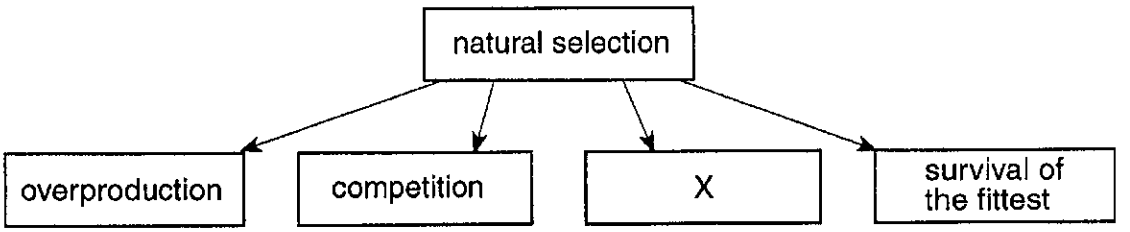
5. In a certain area, DDT-resistant mosquitoes now exist in greater numbers than ten years ago. What is the most probable explanation for this increase in numbers?
   (1) Genetic differences permitted some mosquitoes to survive DDT use.
   (2) Mosquito eggs were most likely to have been fertilized-when exposed to DDT.
   (3) DDT acted as a reproductive hormone for previous generations of mosquitoes.
   (4) DDT serves as a new source of nutrition.

6. After the Industrial Revolution, dark-colored moths outnumbered light-colored moths in certain regions of England. Within the past 40 years, factories in these regions have added scrubbers and air purifiers to their smokestacks, and the relative number of light-colored moths has increased. The probable reason for this increase is that
   (1) the allele for light color became dominant over the allele for dark color
   (2) the environment favored the survival of light-colored moths over dark-colored moths
   (3) dark-colored moths turned light because they needed to survive
   (4) overpopulation occurred and most of the light-colored moths died, leaving only dark-colored moths to reproduce

7. Traits that are *least* beneficial to a species tend to decrease in frequency from generation to generation because these traits usually
   (1) have a high survival value
   (2) have a low survival value
   (3) are inherited by more individuals
   (4) affect only the older members of the population

8. Darwin's studies of finches on the Galapagos Islands suggest that the finches' differences in beak structure were most directly due to
   (1) acquired characteristics in the parent finches
   (2) the size of the island where the finches live
   (3) mating behaviors of the different finch species
   (4) adaptations of the finches to different environments

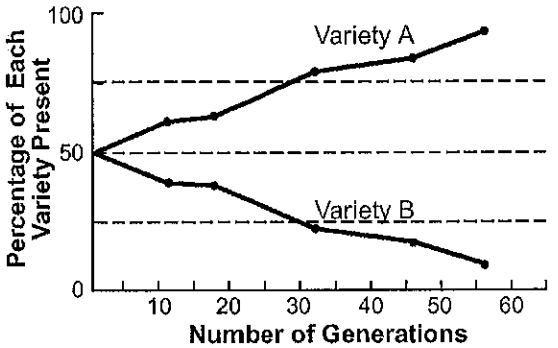
Some of the concepts included in Darwin's theory of natural selection are represented in the diagram below.



Which concept would be correctly placed in box *X*?

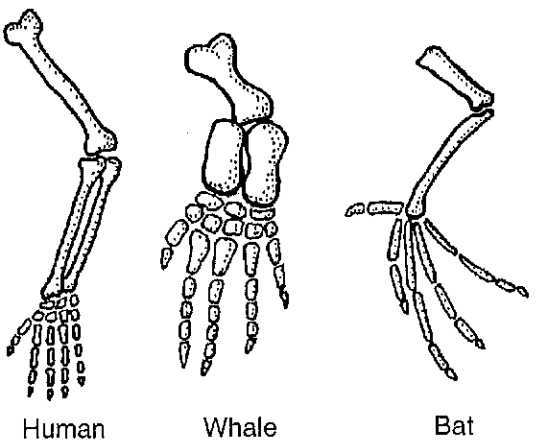
(1) use and disuse
(2) variation
(3) changes in nucleic acids
(4) transmission of acquired traits

10. What is the most probable reason for the increase in the percentage of variety *A* in the population of the species shown in the graph below?



(1) There is no chance for variety *A* to mate with variety *B*.
(2) There is no genetic difference between variety *A* and variety *B*.
(3) Variety *A* is less fit to survive than variety *B* is.
(4) Variety *A* has some adaptive advantage that variety *B* does not have.

11. The diagrams below show the bones in the forelimbs of three different organisms.



Differences in the bone arrangements support the hypothesis that these organisms

(1) are members of the same species
(2) may have descended from the same ancestor
(3) have adaptations to survive in different environments
(4) all contain the same genetic information

12. Which statement is most consistent with the theory of evolution as stated by Lamarck?

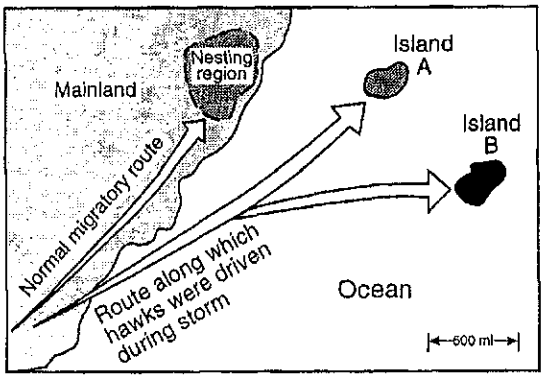
(1) In a litter of puppies, the weakest one died.
(2) A cat that lost a toe produced a kitten missing a toe.
(3) The mutation rate of a bacterium increased under ultraviolet light.
(4) A change in DNA structure produced longer tails in monkeys.

13. In 1889, August Weismann, a German biologist, conducted an experiment attempting to produce mice without tails. He cut the tails off adult mice and then permitted them to mate. All offspring had long tails. He repeated the experiment many times, always with the same results. This experiment helped to *disprove* the concept of
    (1) overproduction in a species
    (2) inheritance of acquired characteristics
    (3) survival of the fittest
    (4) struggle for existence

14. Which statement is *not* included as a part of the modern theory of evolution?
    (1) Sexual reproduction and mutation provide variation among organisms.
    (2) Traits are transmitted by genes and chromosomes.
    (3) More offspring are produced than can possibly survive.
    (4) New organs arise when they are needed.

15. Two squirrel populations are prevented from mating only because they live on opposite sides of the Colorado River. This situation is an example of
    (1) reproductive isolation
    (2) geographic isolation
    (3) adaptive radiation
    (4) natural selection

16. Thousands of years ago, a large flock of hawks was driven from its normal migratory route by a severe storm. The birds scattered and found shelter on two distant islands, as shown on the map below. The environment of island A is very similar to the hawk's original nesting region. The environment of island B is very different from that of island A. The hawks have survived on these islands to the present day with no migration between the populations.



    Which statement most accurately predicts the present-day condition of these island hawk populations?
    (1) The hawks that landed on island B have evolved more than those on island A.
    (2) The hawks that landed on island A have evolved more than those on island B.
    (3) The populations on islands A and B have undergone identical mutations.
    (4) The hawks on island A have given rise to many new species.

17. A large island in the Pacific Ocean supports isolated populations of two groups of frogs. The following observations of these frogs were recorded by scientists.

    (*A*) Are different in color
    (*B*) Excrete different products
    (*C*) Live in different, isolated habitats
    (*D*) Can interbreed and produce fertile offspring

    Which observation best supports the inference that these frogs belong to the same species?
    (1) *A*
    (2) *B*
    (3) *C*
    (4) *D*

18. The Florida panther, a member of the cat family, has a population of fewer than 100 individuals and has limited genetic variation. Which inference based on this information is valid?
(1) These animals will begin to evolve rapidly.
(2) Over time, these animals will become less likely to survive in a changing environment.
(3) These animals are easily able to adapt to the environment.
(4) Over time, these animals will become more likely to be resistant to disease.

19. A factor that tends to cause species to change is a
(1) stable environment
(2) lack of migration
(3) recombination of genes
(4) decrease of mutations

20. Which process would have the *least* influence on the rate of evolutionary change?
(1) sexual reproduction
(2) mutation
(3) meiosis
(4) asexual reproduction

21. Variations within a species are most likely the result of
(1) mutations and sexual reproduction
(2) synapsis and disjunction
(3) mitosis and asexual reproduction
(4) overpopulation and recombination

22. A large population of houseflies was sprayed with a newly developed, fast-acting insecticide. The appearance of some houseflies that are resistant to this insecticide supports the concept that
(1) species traits tend to remain constant
(2) biocides cause mutations
(3) variation exists within a species
(4) the environment does not change

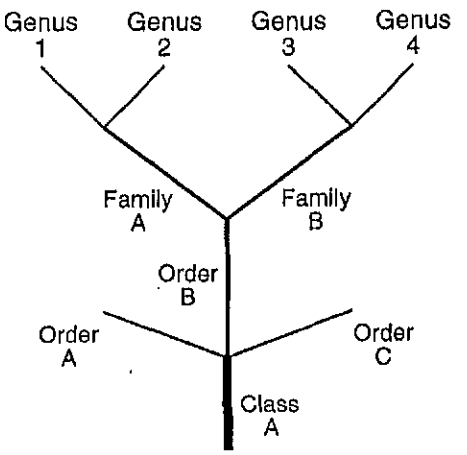
23. Which process is *least* likely to add to the variety of traits in a population?
(1) deletion of bases from DNA
(2) genetic engineering
(3) accurate replication of DNA
(4) exchange of segments between chromosomes

24. Which concept do biologists frequently use to explain the similarities between different species in early embryonic development?
(1) genetic recombination
(2) overproduction
(3) common ancestry
(4) selective breeding

25. Fish, reptiles, and mammals each contain gill slits during part of their embryological development. Which statement best explains this observation?
(1) Their embryos all swam in the sea.
(2) They each evolved one from the other.
(3) They all had a common ancestor.
(4) They do not excrete gases during their development.

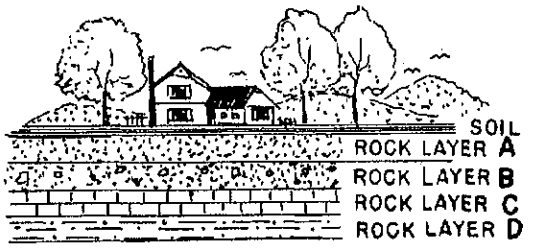
26. The sequence of amino acids in horse hemoglobin is very similar to the sequence of amino acids in human hemoglobin. This evidence supporting organic evolution has been drawn from studies in the field of comparative
(1) biochemistry (3) anatomy
(2) cytology (4) embryology

27. The diagram below shows the evolutionary relationships between several groups of organisms.



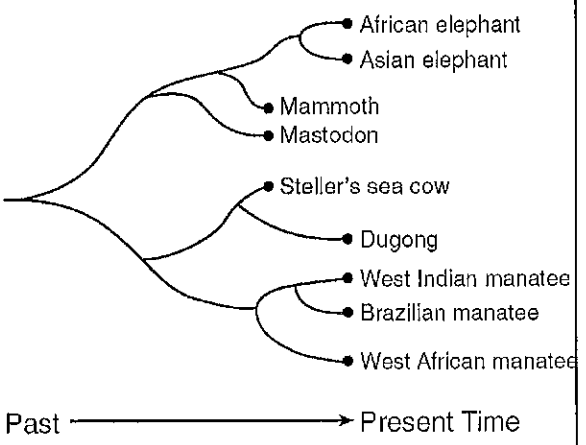
Organisms with the greatest biochemical similarities would most likely be found in which pair of genera?
(1) 1 and 3 (3) 3 and 4
(2) 2 and 3 (4) 1 and 4

28. A geologist finds fossils in each of the undisturbed rock layers represented in the diagram below. The fossils are all structurally similar. Which is the most likely conclusion that the geologist would make?



(1) All the fossils are of the same age.
(2) The relative ages of the fossils cannot be determined.
(3) The fossils in rock layer *D* are older than those in layer *A*.
(4) The fossils in rock layer *B* are older than those in layer *C*.

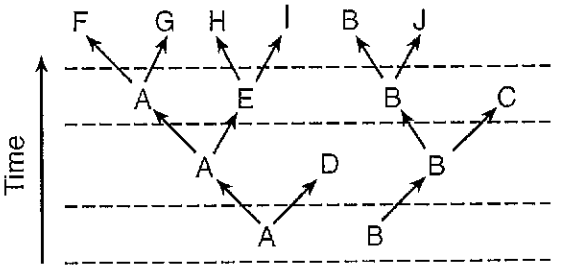
29. The relationship of some mammals is indicated in the diagram below.



Which statement about the African elephant is correct?

(1) It is more closely related to the mammoth than it is to the West African manatee.
(2) It is more closely related to the West Indian manatee than it is to the mastodon.
(3) It is not related to the Brazilian manatee or the mammoth.
(4) It is the ancestor of Steller's sea cow.

Base your answers to questions **30** and **31** on the diagram below and on your knowledge of biology. Letters *A* through *J* represent different species of organisms. The vertical distances between the dotted lines represent long periods of time in which major environmental changes occurred.



30. Which species was the first to become extinct?

(1) *E* (3) *C*
(2) *J* (4) *D*

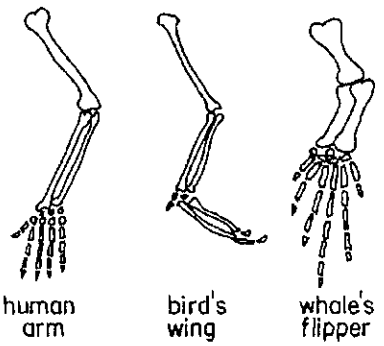
31. Which species appears to have been most successful in surviving changes in the environment over time?

(1) *A* (3) *C*
(2) *B* (4) *H*

32. Which term describes appendages that may have different functions, but are similar in structure an are assumed to have the same evolutionary origin?

(1) fossils (3) homologous
(2) homozygous (4) mutations

33. The diagrams below illustrate three homologous structures.



The structural similarities represented in the diagrams are considered supporting evidence for

(1) the heterotroph hypothesis
(2) a common ancestry
(3) use and disuse
(4) geographic isolation

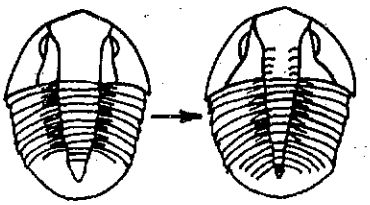
34. The presence of some similar structures in all vertebrates suggests that these vertebrates

(1) all develop at the same rate
(2) evolved from different animals that appeared on Earth at the same time
(3) all develop internally and rely on nutrients supplied by the mother
(4) may have an evolutionary relationship

35. Some scientists suggest that the mass extinction of dinosaurs resulted from sudden global weather changes caused by the impact of an asteroid on Earth. This event most likely promoted the evolution of new species of animals. These ideas best support the concept of

(1) punctuated equilibrium
(2) use and disuse
(3) gradualism
(4) geographic isolation

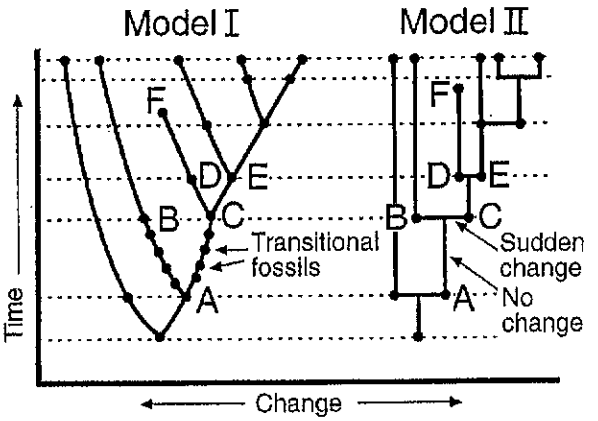
36. The diagram below represents the change in a species of trilobite over a period of 3 million years.



This type of evolutionary change best illustrates

(1) use and disuse
(2) punctuated equilibrium
(3) gradualism
(4) transmission of acquired characteristics

37. Models I and II in the graph below show two different evolutionary pathways.



Which evolutionary concepts are best represented by model I and model II?

(1) Model I represents gradualism; model II represents punctuated equilibrium.
(2) Model I represents punctuated equilibrium; model II represents gradualism.
(3) Model I represents speciation; model II represents acquired characteristics.
(4) Model I represents acquired characteristics; model II represents speciation.

38. Which population of organisms would be in greatest danger of becoming extinct?
    (1) A population of organisms having few variations living in a stable environment.
    (2) A population of organisms having few variations living in an unstable environment.
    (3) A population of organisms having many variations living in a stable environment.
    (4) A population of organisms having many variations living in an unstable environment.

39. Which factor contributed most to the extinction of many species?
    (1) changes in the environment
    (2) lethal mutations
    (3) inability to evolve into simple organisms
    (4) changes in migration patterns

40. According to the heterotroph hypothesis, the earliest heterotrophs must have
    (1) been able to synthesize organic molecules from inorganic compounds
    (2) used oxygen from the atmosphere for respiration
    (3) survived on existing organic molecules in the seas
    (4) been unable to carry on anaerobic respiration

41. According to the heterotroph hypothesis, in addition to water, the raw materials used to produce the most primitive life forms on Earth were probably
    (1) nitrogen, carbon dioxide, and oxygen
    (2) hydrogen, methane, and ammonia
    (3) carbon monoxide, ammonia, and oxygen
    (4) hydrogen, oxygen, and nitrogen

42. The results provided by Stanley Miller's experiments involving a simulated primitive environment, as described in the heterotroph hypothesis, show that in this environment
    (1) only inorganic molecules can be synthesized
    (2) there is little possibility for the synthesis of complex molecules
    (3) organic molecules can be synthesized
    (4) only complex nucleic acid molecules can be synthesized

43. The first life-forms to appear on Earth were most likely
    (1) complex single-celled organisms
    (2) complex multicellular organisms
    (3) simple single-celled organisms
    (4) simple multicellular organisms