Name: _____

AP Biology
Mr. Pellegrino

Evolution Practice Test Questions

1. How is natural variation used in artificial selection?
   a. Nature provides the variation among different organisms and humans select this differences
   b. Nature only produces the most fit species
   c. Humans chose to bred animals with little or no natural variation
   d. Natural variation is not used in artificial selection.

2. Natural selection acts on _____ which in turn may result in the evolution of_____ over time.
   a. Populations, individuals
   b. Individuals, populations
   c. Species, species
   d. Individuals, families

3. Pandas developed longer wrists to better eat bamboo over time and in turn increase their chance of survival. This is an example of:
   a. Fitness
   b. Comparative Anatomy
   c. Artificial Selection
   d. Adaptation

4. Which of the following does NOT provide evidence for evolution?
   a. Cytology
   b. Biochemical Processes
   c. Fitness
   d. Comparative Anatomy

5. How does natural selection contribute to the theory of evolution?
   a. Over time, natural selection results in changes in the inherited characteristics of a population.
   b. Natural selection selects for the same animals every time
   c. Natural selection acts on populations
   d. Over time, natural selection evolves populations

6. The struggle for existence refers to:
   a. The hardships newborn offspring face due to predation
   b. The struggle for animals who cannot breathe
   c. Members of each species compete regularly to obtain food and living space
   d. The hardships between parents of raising offspring

7. What is the relationship between natural selection and fitness?
   a. Descent with modification
   b. Changes in inherited characteristics of a population increase a species' fitness in its environment.
   c. Natural selection selects for traits of the most fit animals to pass on genes to the next generation.
   d. b & c

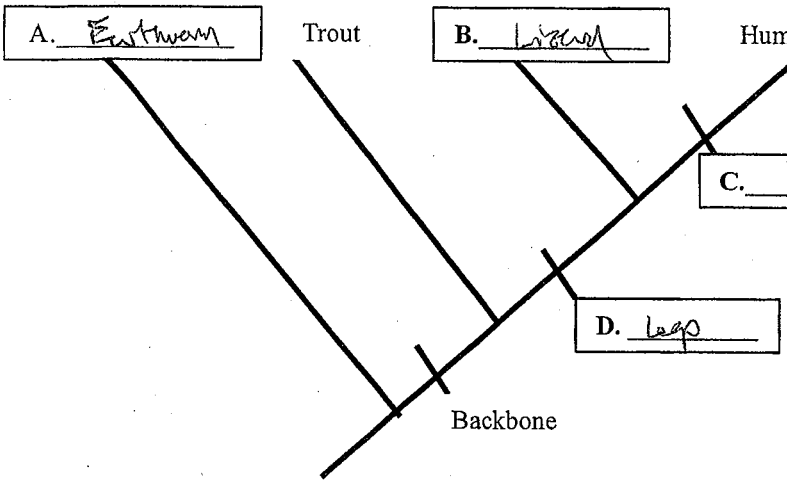
8. Farmer Joe only breeds the largest hogs, the fastest horses, or the cows that give the most milk. This is an example of:
   a. Natural selection
   b. Fitness
   c. Artificial selection
   d. Survival of the fittest

9. The streamline shape of sharks and whales, similar but not due to a common ancestor is an example of:
   a. Analogous traits
   b. Homologous traits
   c. Artificial selection
   d. Fitness

10. Metabolism of organisms based on the same complex compounds, like protein cytochrome c, essential for aerobic respiration, is an example of:
   a. Biochemical processes
   b. Cellular respiration
   c. Cytology
   d. Entomology

11. The answer to the previous question is essential in evolution because:
   a. Those processes are not present across all species
   b. All animals can breathe
   c. All animals need lungs to breathe
   d. Those processes are present across all species likely due to decent from a common ancestor.

12. Below is a cladogram missing some of its parts. Use the derived characteristic chart to the right of the cladogram and filled in clues to write in the missing parts of the cladogram. Use this cladogram to answer questions 13-15. (Synthesis, Obj. 4)



Organism	Derived Character		
	Backbone	Legs	Hair
Earthworm	Absent	Absent	Absent
Trout	Present	Absent	Absent
Lizard	Present	Present	Absent
Human	Present	Present	Present

13. What trait separates the LEAST closely related organism from the other animals?
    a. Hair
    b. Legs
    c. Backbone
    d. None of the above

14. From this cladogram, we can conclude that _____ shares the most recent common ancestor with humans.
    a. Lizard
    b. Trout
    c. Earthworm
    d. None share with humans

15. Based on the cladogram above, rank each species in order of distance from the LEAST closely related organism.
    a. Human, Lizard, Trout, Earthworm
    b. Earthworm, Trout, Lizard, Human
    c. Lizard, Trout, Earthworm, Human
    d. Human, Earthworm, Trout, Lizard

D 16. According to Darwin's theory of natural selection, the individuals that tend to survive are those that have
a. characteristics their parents acquired by use and disuse.
b. characteristics that plant and animal breeders value.
c. the greatest number of offspring.
d. variations best suited to environmental conditions.

C 17. Which of the following phrases best describes the results of natural selection?
a. the natural variation found in all populations
b. unrelated species living in different locations
c. changes in the inherited characteristics of a population over time
d. the struggle for existence undergone by all living things

A 18 Which statement is part of Darwin's theory of evolution by natural selection?
a. More offspring are produced than can possibly survive.
b. The organisms that are the fittest are always largest and strongest.
c. The number of offspring is not related to fitness.
d. Acquired characteristics that are inherited are the cause of evolution.

C 19 The principle of common descent helps explain why
a. well-adapted species have many offspring.
b. conditions in an organism's environment ensures the organism's survival.
c. birds and reptiles share a number of inherited characteristics.
d. tigers are so different from cheetahs.

D 20 The hypothesis that all species are descended from common ancestors was proposed by
a. James Hutton.
b. Jean-Baptiste Lamarck.
c. Thomas Malthus.
d. Charles Darwin.

B 21 Charles Darwin's theory of evolution by natural selection explains each of the following EXCEPT how
a. species can become extinct.
b. inherited traits are passed from parent to offspring.
c. species descend from common ancestors.
d. evolution takes place in the natural world.

B 22 Charles Darwin viewed the fossil record as
a. evidence that Earth was thousands of years old.
b. useful support for his theory.
c. interesting but unrelated to the evolution of modern species.
d. evidence that traits are acquired through use or disuse.

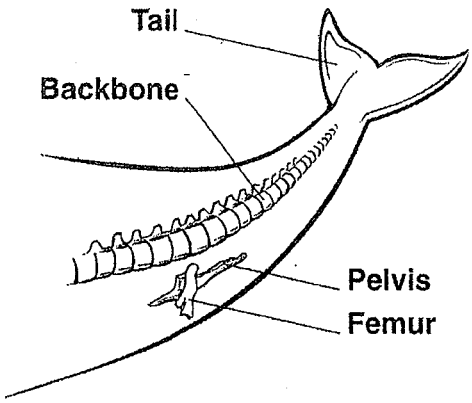


Figure 16–1

B 23. In humans, the pelvis and femur, or thigh bone, are involved in walking. In whales, the pelvis and femur shown in Figure 16–1 are
   a. examples of fossils.
   b. vestigial structures.
   c. acquired traits.
   d. examples of natural variation.

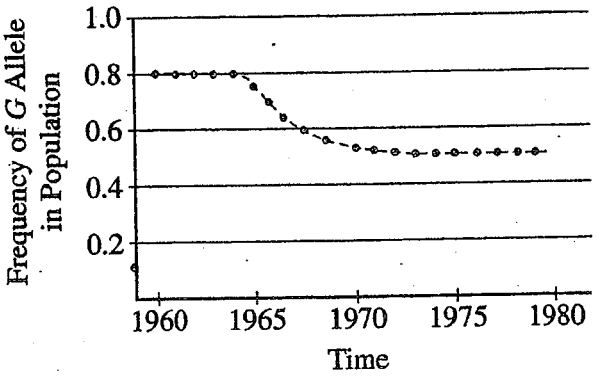
A 24. Modern sea star larvae resemble some primitive vertebrate larvae. This similarity may suggest that primitive vertebrates
   a. share a common ancestor with sea stars.
   b. evolved from sea stars.
   c. evolved before sea stars.
   d. belong to the same species as sea stars.

A 25. Molecular evidence in support of natural selection includes
   a. the nearly universal genetic code.
   b. the presence of vestigial structures.
   c. a tendency toward perfect, unchanging DNA in various species.
   d. the transmission of acquired characteristics by DNA.

Section I

Questions 106-110 refer to the following.

A moth's color is controlled by two alleles, *G* and *g*, at a single locus. *G* (gray) is dominant to *g* (white). A large population of moths was studied, and the frequency of the *G* allele in the population over time was documented, as shown in the figure below. In 1980 a random sample of 2,000 pupae was collected and moths were allowed to emerge.



106. During which of the following time periods could the population have been in Hardy-Weinberg equilibrium for the *G* locus?

I. 1960-1964
II. 1965-1972
III. 1973-1980

(A) I only
(B) II only
(C) III only
(D) I and III only
(E) I, II, and III

5. *A* represents the dominant allele and *a* represents the recessive allele of a pair. If, in 1,000 offspring, 500 are *aa* and 500 are of some other genotype, which of the following are most probably the genotypes of the two parents?

(A) *Aa* and *Aa*
(B) *Aa* and *aa*
(C) *AA* and *Aa*
(D) *AA* and *aa*
(E) *aa* and *aa*

107. Assuming that the population was in Hardy-Weinberg equilibrium for the *G* locus, what percentage of moths in the natural population was white in 1962 ?

(A) 2%
(B) 4%
(C) 8%
(D) 20%
(E) 64%

108. Assuming that the population was in Hardy-Weinberg equilibrium for the *G* locus, what percentage of the gray moths that emerged in 1980 was heterozygous?

(A) 0%
(B) 25%
(C) 33%
(D) 67%
(E) 100%

109. Assuming that the population was in Hardy-Weinberg equilibrium for the *G* locus, what was the frequency of allele *G* in the gray moths that emerged in 1980 ?

(D) 0.75 – Correct

110. Which of the following is the most likely reason for the observed differences in the frequency of the *G* allele between 1965 and 1972 ?

(A) Emigration of white moths from the population
(C) Selection against gray phenotypes
(D) Speciation
(E) Mutation

GO ON TO THE NEXT PAGE

6

Questions 77-79.

A survey reveals that 25 percent of a population of 1,000 individuals have attached earlobes (are homozygous recessive for the trait). For the following questions, assume that the population fits the parameters of the Hardy-Weinberg law.

77. What is the frequency of the recessive allele?

(A) $\sqrt{0.75}$
(B) 0.75
(C) $\sqrt{0.50}$
(D) $\sqrt{0.25}$
(E) 0.25

78. Unlike most natural populations, this population is best characterized in which of the following ways?

(A) There is genetic equilibrium.
(B) There is gene flow.
(C) There is genetic drift.
(D) Mutations occur.
(E) Mating is nonrandom.

79. If p equals the frequency of the dominant allele and q equals the frequency of the recessive allele, which of the following terms represents the frequency of the individuals who show the dominant phenotype?

(A) p^2
(B) q^2
(C) $2pq$
(D) $p^2 + 2pq$
(E) $p^2 + q^2$

54. In certain Native American groups, albinism due to a homozygous recessive condition in the biochemical pathway for melanin is sometimes seen. If the frequency of the allele for this condition is 0.06, which of the following is closest to the frequency of the dominant allele in this population? (Assume that the population is in Hardy-Weinberg equilibrium.)

(A) 0.04
(B) 0.06
(C) 0.16
(D) 0.36
(E) 0.94

19. Rates of adaptive radiation typically are at their highest in which of the following situations?

(A) When Earth is exposed to increased electromagnetic waves caused by Sun flares
(B) In very large, randomly mating populations
(C) When new niches become available
(D) When many species are competing for the same limited resource
(E) When food is abundant

Name: _____

Biology
Evolution Review

1 The forelegs of a frog and a horse are examples of structures that are (1) heterotrophic (2) homozygous (3) hermaphroditic (4) homologous

2 The similarity among the blood proteins of all the mammals may be taken as evidence for evolutionary relationships based upon (1) comparative anatomy (2) geographic distribution (3) comparative embryology (4) comparative biochemistry

3 The wings of experimental fruit flies were clipped short each generation for fifty generations. The fifty-first generation emerged with normal-length wings. This observation would tend to disprove the theory of evolution based on (1) inheritance of mutations (2) inheritance of acquired characteristics (3) natural selection (4) survival of the fittest

4 Darwin's theory of evolution did *not* contain the concept that (1) genetic variations are produced by mutations and sexual recombination (2) organisms that survive are best adapted to their environment (3) population sizes remain constant due to a struggle for survival (4) favorable traits are passed from one generation to another

5 The diagram below represents a section of undisturbed rock and the general location of fossils of several closely related species. According to currently accepted evolutionary theory, which is the most probable correct assumption to be made concerning species *A*, *B*, *C*, and *D*?

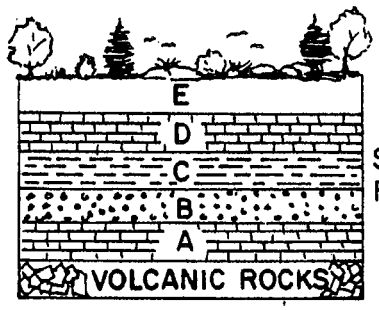
species C & D
species C
species A & B & C
species A & B
species A

(1) *A* is the ancestor of *B*, *C*, and *D*. (2) *B* was already extinct when *C* evolved. (3) *C* evolved more recently than *A*, *B*, and *D*. (4) *D* is the ancestor of *A*, *B*, and *C*.

6 The formation of the large streptomycin-resistant population is based on (1) variations and survival of the fittest (2) mutations and asexual reproduction (3) sexual reproduction and no mutations (4) survival of the fittest and cloning

7 According to modern evolutionary theory, the resistance to streptomycin probably resulted directly from (1) culturing the *Escherichia coli* (2) changes in temperature under which *Escherichia coli* are grown (3) a change in the DNA of *Escherichia coli* (4) the presence of streptomycin

8 The diagram below represents a cross section of undisturbed rock layers.



A scientist discovers bones of a complex vertebrate species in layers *B* and *C*. In which layer would an earlier, less complex form of this vertebrate most likely first appear? (1) *A* (2) *E* (3) *C* (4) *D*

9 Which conclusion may be made when comparing fossils found in previously undisturbed strata of sedimentary rock? (1) The fossils in the upper strata are younger than those in the lower strata. (2) The fossils in the upper strata are older than those in the lower strata. (3) The fossils in the upper strata are generally less complex than those in the lower strata. (4) There are no fossils in the upper strata that resemble those in the lower strata.

10 Many related organisms are found to have the same enzymes and hormones. This suggests that (1) enzymes work only on specific substrates (2) enzymes act as catalysts in biochemical reactions (3) organisms living in the same environment require identical enzymes (4) these organisms may share a common ancestry

11 Which assumption is the basis for the use of the fossil record as evidence for evolution? (1) Fossils have been found to show a complete record of the evolution of all mammals. (2) In undisturbed layers of the earth's crust, the oldest fossils are found in the lowest layers. (3) All fossils can be found embedded in rocks. (4) All fossils were formed at the same time.

12 Which is an example of evidence of evolution based on comparative biochemistry? (1) Sheep insulin can be substituted for human insulin. (2) The structure of a whale's flipper is similar to that of a human hand. (3) Human embryos have a tail-like structure at one stage in their development. (4) Both birds and bats have wings.

13 If a rabbit is sensitized to human blood, the blood of the rabbit will react to chimpanzee blood very much the way it does to human blood. This is an example of which type of evidence supporting the theory of evolution? (1) comparative habitat (2) comparative anatomy (3) comparative embryology (4) comparative biochemistry

14 The presence of gill-like slits in a human embryo is considered to be evidence for the (1) theory that fish and mammals have a common ancestry (2) theory that the first organisms on Earth were heterotrophs (3) close relationship between fish and mammalian reproductive patterns (4) close relationship

15) Certain strains of bacteria that were susceptible to penicillin in the past have now become resistant. The probable explanation for this is that (1) the mutation rate must have increased naturally (2) the strains have become resistant because they needed to do so for survival (3) a mutation was retained and passed on to succeeding generations because it had high survival value (4) the principal forces influencing the pattern of survival in a population are isolation and mating

16 The theory of continental drift hypothesizes that Africa and South America were once a single landmass, but have drifted apart over millions of years. The "Old World" monkeys of Africa, although similar, show several genetic differences from the "New World" monkeys of South America. Which factor is probably the most important for maintaining these differences? (1) fossil records (2) comparative anatomy (3) use and disuse (4) geographic isolation

17 A change in the frequency of any mutant allele in a population most likely depends on the (1) size of the organisms possessing the mutant allele (2) adaptive value of the trait associated with the mutant allele (3) degree of dominance of the mutant allele (4) degree of recessiveness of the mutant allele

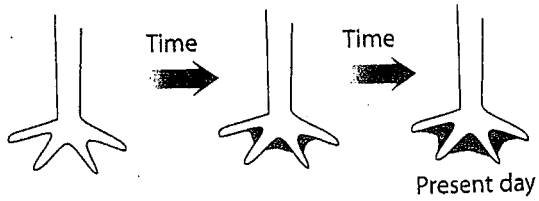
18 Many modern evolutionists have accepted much of Darwin's theory of evolution, but have added genetic information that gives a scientific explanation of (1) overproduction (2) the struggle for existence (3) the survival of the fittest (4) variations

19 As a result of sexual reproduction, the rate of evolutionary change in the plant and animal kingdoms has been greatly speeded up because (1) the offspring show more diversity than in asexual reproduction (2) characteristics change less frequently than in asexual reproduction (3) environmental changes never affect organisms produced by asexual reproduction (4) two parents have fewer offspring than one parent

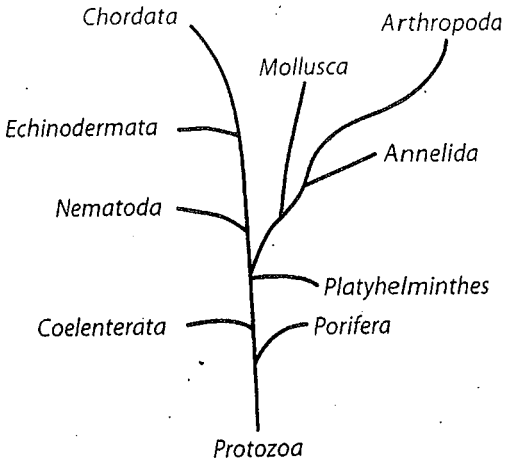
20 Populations of a species may develop traits different from each other if they are isolated geographically for sufficient lengths of time. The most likely explanation for these differences is that (1) acquired traits cannot be inherited by offspring (2) environmental conditions in the two areas are identical (3) genetic recombination tends to be different in both populations (4) mutations are likely to be the same in both populations

21 According to the theory of gradualism, the accumulation of small variations in a population eventually leads to (1) geographic isolation (2) a punctuated equilibrium (3) development of a new species (4) the heterotroph hypothesis

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



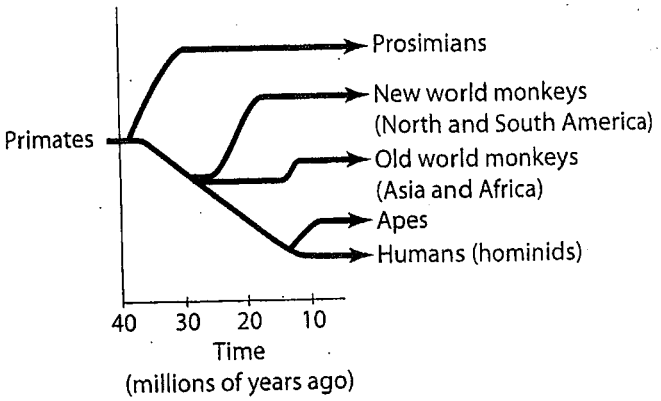
These changes can best be explained by the concept of (1) natural selection (2) extinction (3) stabl



23 The statement that is best supported by the diagram is that (1) *Annelida* and *Arthropoda* have an ancestor in common (2) *Echinodermata* are more closely related to *Mollusca* than they are to *Chordata* (3) *Mollusca* and *Arthropoda* probably evolved before *Porifera* (4) *Annelida* and *Arthropoda* evolved from *Echinodermata*

24 The study of fossils has allowed scientists to (1) describe past environments and the history of life (2) study present ocean temperatures at different depths (3) analyze the chemical composition of sedimentary rocks and minerals (4) describe the details of the process by which life began on Earth

25 The following diagram represents possible lines of the evolution of primates.



Which inference can best be made based on the diagram? (1) Adaptations for living in trees are inherited by all primates. (2) Humans and apes have a common ancestor. (3) The embryos of monkeys and apes are identical. (4) The period of development is similar in most primates.

26 Which statement is basic to the theory of evolution by natural selection? (1) In general, living organisms maintain a constant population from generation to generation. (2) Changes in living organisms are almost completely the result of mutations. (3) Natural variations are inherited. (4) There is little competition between species.

27 Which statement is NOT included as part of our modern understanding of evolution? (1) Sexual reproduction and mutations provide variation among offspring. (2) Traits are transmitted by genes and chromosomes. (3) More offspring are produced than can possibly survive. (4) New organs are formed when organisms need them.

28 The modern theory of evolution states that a basis for variation within a species is provided by (1) mutations (2) asexual reproduction (3) cloning (4) overproduction

29 An athlete explains that his muscles have become well-developed through daily activities of weight lifting. He believes that his offspring will inherit this trait of well-developed muscles. This belief would be most in agreement with the theory set forth by (1) Darwin (2) Lamarck (3) Weismann (4) Mendel

30 Natural selection can best be defined as (1) survival of the strongest organisms (2) elimination of the smallest organisms by the largest organisms (3) survival of those organisms genetically best adapted to the environment (4) survival and reproduction of those organisms that occupy the largest area in an environment

31 A supporter of the evolutionary theory set forth by Lamarck would probably theorize that the giraffe evolved a long neck due to (1) need and inheritance of acquired traits (2) mutations and genetic recombination (3) variations and survival of the fittest (4) overproduction and struggle for survival

32 Although similar in many respects, two species of organisms exhibit differences that make each well adapted to the environment in which it lives. The process of change that helps account for these differences is (1) evolution (2) parthenogenesis (3) comparative embryology (4) inheritance of acquired traits

33 The pig has four toes on each foot. Two of the toes are very small and do not have a major function in walking. Lamarck would probably have explained the reduced size of the two small toes by his evolutionary theory of (1) natural selection (2) mutation (3) use and disuse (4) synapsis

34 Weismann's experiments with mice produced results that helped to (1) support Darwin's assumption of a struggle for survival (2) disprove Lamarck's theory of the inheritance of acquired characteristics (3) disprove DeVries' concept of evolution (4) support Lamarck's theory of use and disuse

35 Sexual reproduction is related to evolution because sexual reproduction (1) occurs only in more recently evolved forms of animal life (2) increases the chances of extinction of different species (3) increases the chances for variations to occur (4) is the more usual kind of reproduction

36 Genetic variations are the raw material of evolution. These variations will not be acted upon by natural selection unless they (1) produce unfavorable characteristics (2) produce favorable characteristics (3) are found in the fossil record (4) affect the organisms' appearance or functioning

37 Which of the following is produced by mutation and is essential for evolution to occur? (1) stability in the genetic code of organisms (2) additional DNA in an organism (3) a struggle for existence (4) variations in organisms

38 Which two factors provide the genetic basis for variation within many species? (1) asexual reproduction and meiosis (2) mutations and sexual reproduction (3) competition and the synthesis of proteins (4) ecological succession and mitosis

39 The sudden appearance of a light-colored moth in a large population of dark-colored moths was probably the result of (1) a mutation (2) random mating (3) non-random mating (4) isolation of the moth population

40 Mutations can be transmitted to the next generation if they are present in (1) hormones (2) gametes (3) body cells (4) muscle cells

41 A population of mosquitos is sprayed with a new insecticide. Most of the mosquitos are killed, but a few survive. In the next generation, the spraying continues, but still more mosquitos hatch that are immune to the insecticide. How could these results be explained according to the present concept of evolution? (1) The insecticide caused a mutation in the mosquitos. (2) The mosquitos learned how to fight the insecticide. (3) A few mosquitos in the first population were resistant and transmitted this resistance to their offspring. (4) The insecticide caused the mosquitos to develop an immune response, which was inherited.

42 What would be the most probable effect of geographic isolation in a population? (1) It has no effect on variations in the species. (2) It favors the production of new species. (3) It prevents the occurrence of mutations. (4) It encourages the mixing of gene pools.

43 Two organisms can be considered to be of different species if they (1) cannot mate with each other and produce fertile offspring (2) live in two different geographical areas (3) mutate at different rates depending on their environment (4) have genes drawn from the same gene pool

44. Evolution is the process of the (1) development of one-celled organisms from mammals (2) change in species over long periods of time (3) embryonic development of modern humans (4) changing energy flow in food webs

45 Which phrase best defines evolution? (1) an adaptation of an organism to its environment (2) a sudden replacement of one community by another (3) the isolation of organisms from each other for many years (4) a process of change in species over a period of time

46 Evolution is often represented as a branching tree similar to the one shown in the diagram at the top of the next column. The names shown represent different groups of organisms alive today; the lines represent their evolutionary histories.

47 Compounds like the pesticide DDT may bring about the evolution of new strains of organisms by (1) destroying food producers (2) acting as a natural selecting agent (3) mixing two different sets of genes (4) creating new ecological niches

48 A population of mosquitoes is sprayed with a new insecticide. Most of the mosquitoes are killed, but a few survive. In the next generation, the spraying continues, but still more mosquitoes hatch that are immune to the insecticide. How could these results be explained according to the present concept of evolution? (1) The insecticide caused a mutation in the mosquitoes. (2) The mosquitoes learned how to fight the insecticide. (3) A few mosquitoes in the first population were resistant and transmitted this resistance to their offspring. (4) The insecticide caused the mosquitoes to develop an immune response, which was inherited.

49 Throughout the history of Earth, which factor has probably been the chief cause of the extinction of various species? (1) people's interference with nature (2) failure to adapt to environmental changes (3) warfare within the species (4) volcanic eruptions

50 Fossil evidence indicates that many species have existed for relatively brief periods of time and have then become extinct. Which statement best explains the reason for their short existence? (1) These organisms lacked the energy to produce mutations. (2) Humans modify plant and animal species through the knowledge of genetics. (3) These organisms lacked variations having adaptive value. (4) Within these species, increasing complexity reduced their chances of survival.

51 Possible explanations for the origin of differences in structure, function, and behavior among organisms are contained in the (1) modern cell membrane model (2) theory that genes are on chromosomes (3) model for DNA replication (4) modern theory of evolution

52 In most populations, the individuals that produce the greatest number of offspring are (1) always the strongest (2) usually the best adapted (3) those that have only inheritable traits (4) those that are the most intelligent

53 Even though the American toad and the Fowlers toad are often found living in the same habitat, they do not breed with each other. Which conclusion can best be drawn from this information? (1) The two types of toads do not interbreed because they are geographically isolated. (2) The two types of toads do not interbreed due to differences in mating behavior. (3) Adaptive mutations occurred more often during the evolution of the American toad. (4) Fowlers toad has a higher rate of survival than the American toad does.

54 The best scientific explanation for differences in structure, function, and behavior found in different species of organisms is provided by (1) carbohydrate electrophoresis (2) population chromatography (3) the theory of carrying capacity (4) the theory of evolution

55 Which of the following could be used as evidence to show that two different species of organisms most likely developed from a single, common ancestor? (1) They eat the same types of food. (2) They have different digestive enzymes (3) They lived during the same time period. (4) They contain similar amino acid sequences.

The Pace of Evolution

Two Scientists are discussing their beliefs concerning Evolution and the rate it takes place at in populations. A summary of each of their viewpoints is written below.

Scientist #1

I have always seen evolution as a slow and gradual process, taking millions of years in some cases. Take, for example, a species such as the horse. Many millions of years ago the horse was about as tall as a fox, had toes instead of hooves, and was a hunter and a meat eater. As the environment in which the horse lived changed, the horse evolved adaptations in order to survive in its new environment. He slowly grew bigger and began to eat a vegetarian diet. We have evidence for this change in the form of many fossils showing these changes and intermediate forms in the horse.

Scientist #2

To me, evolution only happens in short bursts. For the most part, organisms stay the same for millions of years, then change over time due to a dramatic shift in the environment. As an example, look at the shark. Even as their ocean environments undergo change, the sharks are so well adapted that they have not needed to evolve for millions of years. If there is some great change to the ocean then the shark will have to evolve in order to survive, but it will do so at a fairly quick rate when compared to the geologic time scale.

Questions

1) Which statement would agree with the opinion of Scientist #2, but not Scientist #1

   a. Plants evolved many adaptations and have many intermediate forms as they moved from water to land

   b. Alligators and crocodiles are well adapted to their environment and have not changed for a long period of time

   c. Cave fish lost their site gradually as they adapted to living in a dark environment

   d. The fossil record shows a number of different human ancestors over the past million years

2) Which statement would be agreed upon by both Scientist #1 and Scientist #2

   a. All species alive today have not evolved in the past million years

   b. Organisms evolve adaptations in response to changes in the environment

   c. Evolution is a process that occurs in short bursts after many years of no change

   d. Most species do not evolve at all and only change in response to intense environmental pressure

3) What might Scientist #2 say about the ability of plants to begin to live on land?

   a. Plants gradually evolved an ability to begin to live on land

   b. A loss of bodies of water caused plants to quickly develop adaptations to live on land

   c. Intermediate forms, such as lily pads, show plants made a gradual move to land

   d. Both water and land plants have the same adaptations, making the move to land quick and easy

4) Which statement would neither Scientist #1 or Scientist #2 agree with?

   a. Organisms evolve adaptations as they need them, then pass them on to their offspring

   b. Birds and dinosaurs have many structural similarities, showing evidence that birds slowly evolved from dinosaurs

   c. Crocodiles have maintained the same basic structure for millions of years, even as their environment changed slightly

   d. The history of life on Earth has shown that species have evolved from simple to more complex

5) Each of the Scientists is given fossil evidence of a species called a lobed finned fish. The fossil shows a fish like creature that had thick front and back fins. The fossil was found in an area of shallow water that is muddy. The presenter of the evidence tells the scientists that during times of drought the fish could use its thick fins to navigate in the mud to shallow water pools, much like an amphibian. Which statement below would match a comment made by the scientist after the presentation?

   a. Scientist 1-"This fossil looks to be an intermediate form between fish and amphibians, it supports my point of view."

   b. Scientist 2-"This fossil looks like it will evolve slowly into an amphibian, it supports my point of view."

   c. Scientist #1-"This fossil does not remind me of any organisms living now. It does not support my point of view."

   d. Scientist #2-"This fossil looks to be an intermediate form between fish and amphibians, it supports my point of view."

6) Evolution that takes place slowly, with many intermediate forms is known as gradualism. If evolution takes place in "short bursts" it is termed punctuated equilibrium. Which list below would correctly categorize the scientist's viewpoints?

   a. Scientist #1-Punctuated Equilibrium, Scientist #2-Gradualism

   b. Scientist #1-Punctuated Equilibrium, Scientist #2-Punctuated Equilibrium

   c. Scientist #1-Gradualism, Scientist #2-Punctuated Equilibrium

   d. Scientist #1-Gradualism, Scientist #2-Gradualism

7) Arcahebacteria are also known as extremeophiles. They are simple single celled-organisms that make their homes in places like chimneys, mud springs, and geysers. Some species may be as much as 4.2 billion years old. More modern bacteria, such as streptococcus, have antibiotic resistance genes that can be passed from organism to organism in a simple variation of sexual reproduction. When needing an example to use when describing their evolutionary beliefs, which organism is best suited for each scientist?

   a. Scientist #1-Archaebacteria, Scientist #2-Streptococcus

   b. Scientist #1-Archaebacteria, Scientist #2-Archaebacteria

   c. Scientist #1-Streptococcus, Scientist #2-Streptococcus

   d. Scientist #1-Strteptococcus, Scientist #2-Archaebacteria

Name: _____

AP Biology
Mr. Pellegrino

1) A number of different phylogenies (evolutionary trees) have been proposed by scientists. These phylogenies are useful because they can be used to

(A) determine when two similar populations of a species evolved into two separate species
(B) evaluate which groups of organisms may be most closely related
(C) demonstrate that all photosynthetic organisms are members of the Kingdom Plantae
(D) demonstrate that natural selection is the prevailing force in evolution
(E) demonstrate which taxa (groups of organisms) contain the most highly evolved species

2) All of the following are included in the modern concept of a biological species EXCEPT

(A) genetic compatibility
(B) viable offspring
(C) fertile offspring
(D) gene flow inhibition
(E) reproductive compatibility

3) The Stanley Miller apparatus demonstrated that organic molecules could assemble spontaneously in an environment lacking free oxygen and containing water, methane, and ammonia in the presence of an abundant energy source, such as an electric discharge. The research was considered supportive of the organic soup hypothesis, which states that the primitive atmosphere provided inorganic precursors from which organic molecules could have been synthesized in the presence of an energy source. Based on subsequent research, the primordial atmosphere was determined to contain less methane and more carbon dioxide. The new data about the composition of the early atmosphere had which of the following effects on origin-of-life hypotheses?

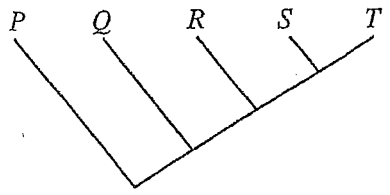
(A) Miller's work was discarded as not relevant to an origin-of-life hypothesis.
(B) Miller's work was used to refute the new hypothesis about the composition of the atmosphere.
(C) The organic soup hypothesis was abandoned as no longer being supportable.
(D) A new organic soup hypothesis was proposed to account for the new data about the atmosphere.

4) In a small group of people living in a remote area, there is a high incidence of "blue skin", a condition that results from a variation in the structure of hemoglobin. All of the "blue-skinned" residents can trace their ancestry to one couple, who were among the original settlers of this region. The unusually high frequency of "blue skin" in the area is an example of

(A) mutation
(B) genetic drift
(C) natural selection
(D) sexual selection
(E) heterozygote advantage

5) In evolutionary terms, which of the following organisms is the most successful?

(A) The one that lives the longest
(B) The one that grows the most rapidly
(C) The one that leaves the greatest number of offspring that survive to reproduce
(D) The one that has the best characteristics for the current environment
(E) The one that has the biggest territory



6) Which of the following conclusions is best supported by the cladogram above?

(A) Species *Q* and *R* make up a monophyletic group.
(B) Species *P* and *Q* are equally related to species *T*.
(C) Species *P* and *T* do not share a common ancestor.
(D) Species *S* evolved from species *R*.
(E) Species *S* is more closely related to species *T* than to species *R*.