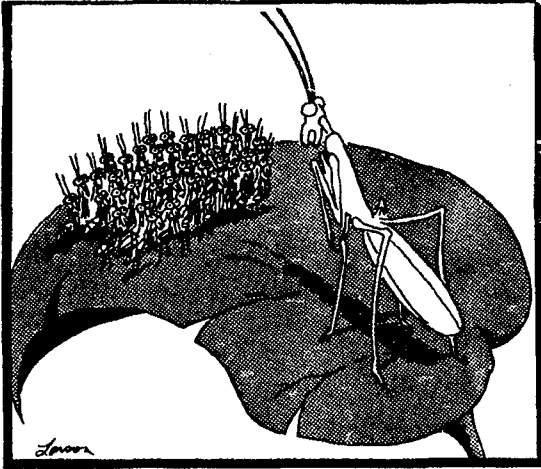


Evolution Review

1. Which is an example of evolution?
 - 1) development of the modern horse from earlier horse species
 - 2) development of muscle tissue from embryonic mesoderm
 - 3) replacement of a lost claw of a lobster
 - 4) germination of a 100-year-old spore when moistened
2. Which statement best supports the inference that the ancestors of modern day elephants had no trunks or tusks and were the size of pigs?
 - 1) Population size tends to remain stable from generation to generation.
 - 2) Evolutionary change is always rapid and continuous.
 - 3) Existing life forms have evolved from earlier life forms.
 - 4) Geographic isolation rarely favors speciation in small populations.
3. The term "evolution" is best described as
 - 1) a process of change in a population through time
 - 2) a process by which organisms become extinct
 - 3) the reproductive isolation of members of certain species
 - 4) the replacement of one community by another
4. Which factor has the greatest effect on the rate of evolution of animals?
 - 1) environmental changes
 - 2) use and disuse
 - 3) asexual reproduction
 - 4) vegetative propagation
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. 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
7. 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

Evolution Review

8. Which evolutionary concept is best illustrated by the cartoon below?



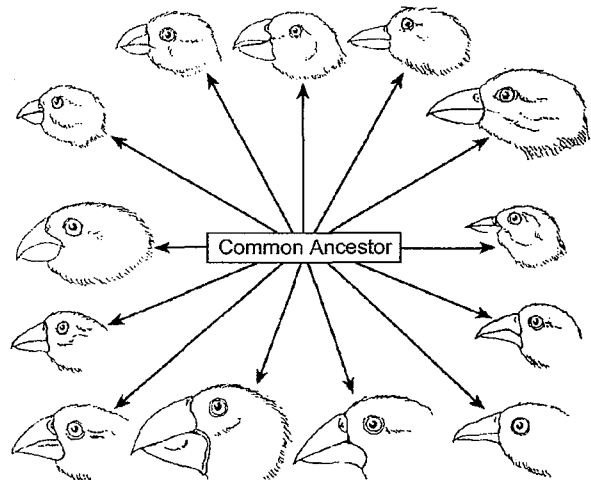
"Of course, long before you mature, most of you will be eaten."

- 1) production of mutations
 - 2) use and disuse
 - 3) survival of the fittest
 - 4) speciation
9. The concept that new varieties of organisms are still evolving is best supported by the
- 1) increasing need for new antibiotics
 - 2) increasing number of individuals in the human population
 - 3) decreasing number of new fossils discovered in undisturbed rock layers
 - 4) decreasing activity of photosynthetic organisms due to warming of the atmosphere

10. When penicillin was first introduced, it was very effective in destroying most of the bacteria that cause gonorrhoea. Today, certain varieties of this bacterium are resistant to penicillin. Which statement best explains the appearance of these resistant varieties?

- 1) Penicillin stimulated the bacteria to become resistant, and this resistance was passed to the offspring.
- 2) Penicillin killed the susceptible bacteria, while naturally resistant varieties survived and reproduced.
- 3) Penicillin used today is not as strong as the penicillin used when it was first introduced.
- 4) Penicillin stimulated the production of antigens in the resistant bacteria.

11. The diversity within the wild bird species in the diagram below can best be explained by which process?



- 1) natural selection
 - 2) asexual reproduction
 - 3) ecological succession
 - 4) mitotic cell division
12. A mouse has its tail completely cut off by a mousetrap. Which concept proposes that the offspring produced by this mouse will be born without tails?
- 1) gene linkage
 - 2) crossing-over between homologous chromosomes
 - 3) survival of the fittest
 - 4) inheritance of acquired characteristics

Evolution Review

13. Based on modern evolutionary theory, the development of a new species would most likely be associated with
- 1) a constant environment
 - 2) stable gene pools
 - 3) geographic isolation
 - 4) a lack of mutations
14. Over a long period of time the organisms on an island changed so that they could no longer interbreed with the organisms on a neighboring island. This inability to interbreed is known as
- 1) hybridization
 - 2) reproductive isolation
 - 3) artificial selection
 - 4) survival of the fittest
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. Geographic and reproductive isolation are most closely associated with
- 1) speciation
 - 2) extinction
 - 3) overproduction
 - 4) competition
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. Darwin observed that different, but closely related, species of finches filled the diverse environmental niches on the different Galapagos Islands. The filling of these environmental niches is known as
- 1) acquired characteristics
 - 2) blending inheritance
 - 3) common ancestry
 - 4) adaptive radiation
19. As a result of sexual reproduction, the rate of evolutionary change in the plant and animal kingdoms has been greatly increased 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. A gene mutation has adaptive value if it
- 1) enables an organism to survive an environmental change
 - 2) results in the production of an unhealthy organism
 - 3) leads to the extinction of a species
 - 4) produces sterility in male members of a species
21. A weakness in Darwin's original theory of evolution was that
- 1) the genetic basis for variation was not explained
 - 2) overproduction never occurs in nature
 - 3) competition occurs in animals but not in plants
 - 4) natural selection does not occur in domestic animals

Evolution Review

22. 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.

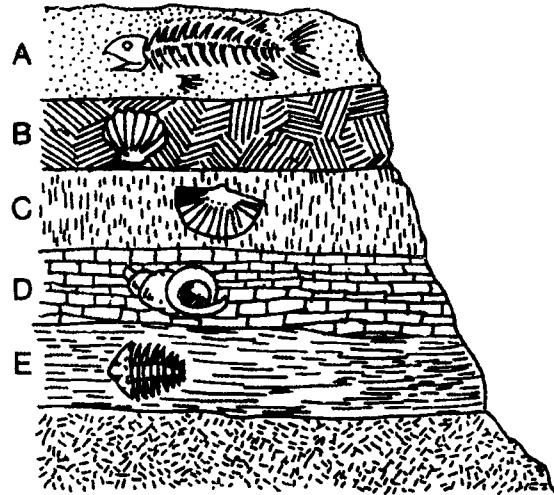
23. Base your answer to the following question on the chart below and on your knowledge of biology.

Species	Sequence of Amino Acids in the Same Part of the Hemoglobin Molecules
Human	Lys-Glu-His-Iso
Horse	Arg-Lys-His-Lys
Gorilla	Lys-Glu-His-Lys
Chimpanzee	Lys-Glu-His-Iso
Zebra	Arg-Lys-His-Arg

The information in the chart provides data that can help in the identification of possible evolutionary relationships from the study of comparative

- 1) cytology
- 2) embryology
- 3) anatomy
- 4) biochemistry

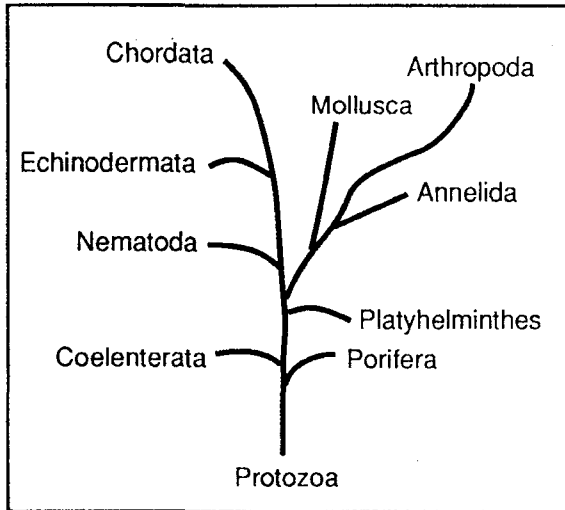
24. In the diagram below of undisturbed sedimentary rock strata, in which rock layer are the fossils of more complex animals generally found?



- 1) A
- 2) B
- 3) E
- 4) D

Evolution Review

25. Evolution is often represented as a tree similar to the one shown in the diagram below.

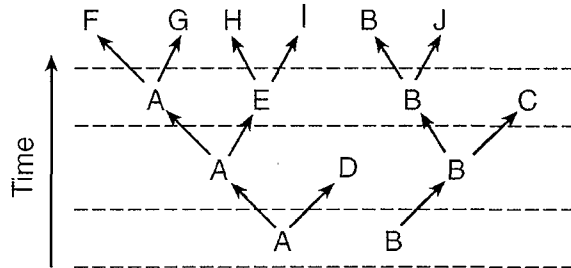


This diagram suggests that

- 1) different groups of organisms may have similar characteristics because of common ancestry
 - 2) because of biochemical differences, no two groups of organisms could have a common ancestor
 - 3) evolution is a predictable event that happens every few years, adding new groups of organisms to the tree
 - 4) only the best adapted organisms will survive from generation to generation
26. Fossil records indicate that between 80 million and 60 million years ago the structure of the horned dinosaur frequently underwent rapid changes separated by long periods of stability. This pattern of change best illustrates the concept of
- 1) use and disuse
 - 2) punctuated equilibrium
 - 3) gradualism
 - 4) enzyme specificity

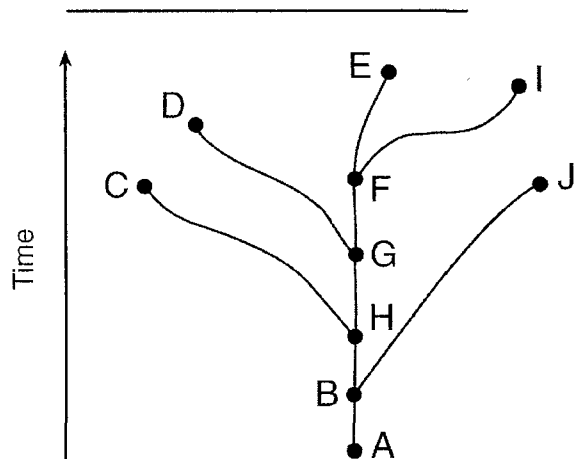
- Base your answers to questions 27 and 28 on the diagram below and on your knowledge of biology.

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.



27. Which species was the first to become extinct?
- 1) *E*
 - 2) *J*
 - 3) *C*
 - 4) *D*
28. Which species appears to have been most successful in surviving changes in the environment over time?
- 1) *A*
 - 2) *B*
 - 3) *C*
 - 4) *H*

- 29.

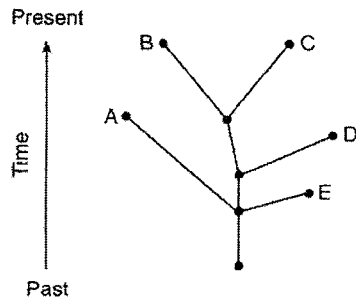


Which two species are the most closely related?

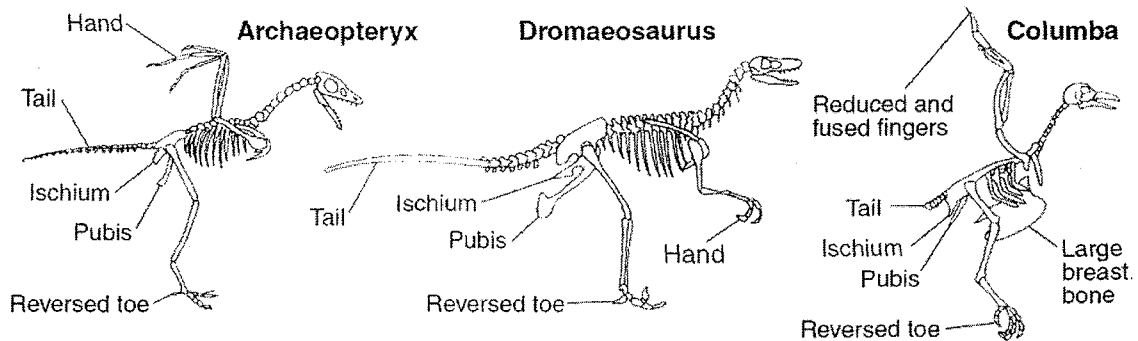
- 1) *C* and *D*
- 2) *E* and *I*
- 3) *G* and *J*
- 4) *A* and *F*

Evolution Review

30. Which statement concerning the evolution of species *A*, *B*, *C*, *D*, and *E* is supported by the diagram below?



- 1) Species *B* and *C* can be found in today's environments.
 - 2) Species *A* and *D* evolved from *E*.
 - 3) Species *A* and *C* can still interbreed.
 - 4) Species *A*, *B*, and *E* all evolved from a common ancestor and all are successful today.
31. Which term describes appendages that may have different functions, but are similar in structure and are assumed to have the same evolutionary origin?
- 1) fossils
 - 2) homozygous
 - 3) homologous
 - 4) mutations
32. The remains of three organisms are shown below.

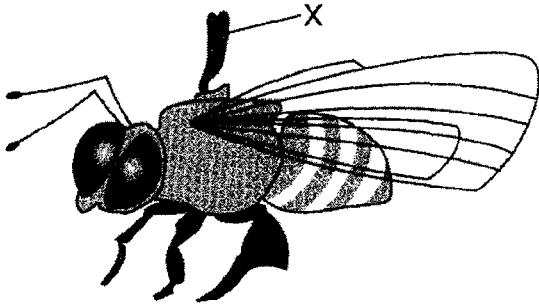


A study of these remains would indicate that these organisms have

- 1) identical food preferences
- 2) identical body sizes
- 3) structural similarities
- 4) habitat similarities

Evolution Review

33. 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.
34. The diagram below represents a species of bee that helps one type of orchid plant reproduce by carrying pollen on structure X from one orchid flower to another. Pollination by this species of bee is the only way the orchid can reproduce.

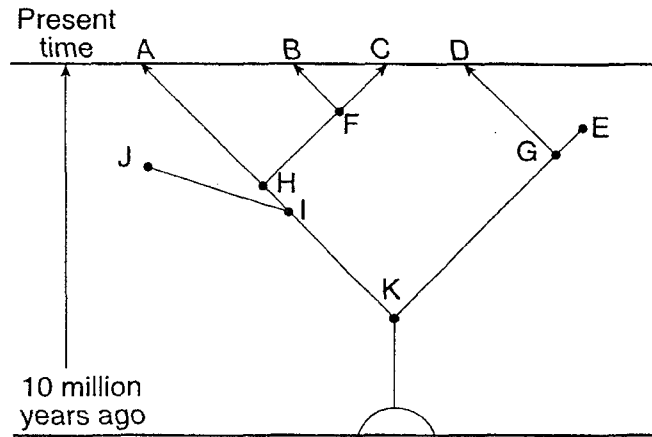


If this bee species dies out, this orchid species would most likely

- 1) cease to exist
 - 2) find another animal to carry the pollen
 - 3) flower at a different time of year
 - 4) develop another way to reproduce
35. A group of biology students participated in a prey-predator laboratory investigation. Fifty green bean seeds and 50 white bean seeds, both representing prey, were scattered in a 25-square-meter area of the school lawn. Three students representing predators were then given 30 seconds to search the area and collect the "prey." This procedure was repeated five times. Using one or more complete sentences, state the hypothesis being tested in this activity.

Evolution Review

36. Base your answer to the following question on the diagram below. The diagram shows an interpretation of relationships based on evolutionary theory. The letters represent different species.



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

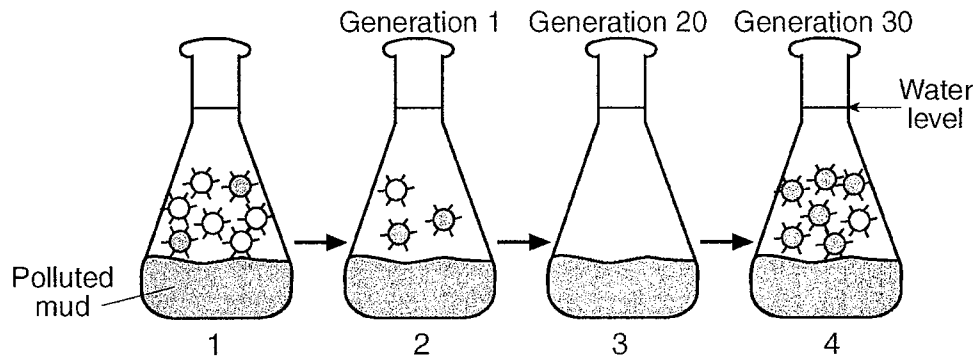
37. State what could happen to a species in a changing environment if the members of that species do not express any genetic variations.

Evolution Review

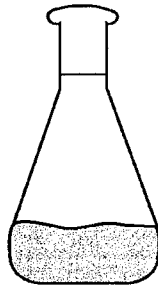
Base your answers to questions 38 and 39 on the information below.

Over the last 30 years, a part of the Hudson River known as Foundry Cove has been the site for many factories that have dumped toxic chemicals into the river. Some of these pollutants have accumulated in the mud at the bottom of the river. The polluted cove water contains many single-celled organisms and simple multicellular animals. Curiously, when the same species from nearby regions with nonpolluted sediments are moved to the polluted cove water, they die.

Scientists hypothesized that the organisms living in the cove have evolved so that they are able to survive in polluted water. To test this hypothesis, biologists tried to duplicate the history of the cove in the laboratory. They took a large number of one species of simple animal from a cove with unpolluted mud and placed them in a flask that contained polluted mud from Foundry Cove (diagram 1). Most of the animals died, but a few survived (diagram 2). The scientists then bred the survivors with each other for several generations producing offspring that were descendants of the survivors. When placed in Foundry Cove, most of these descendants survived. The diagrams below represent the steps in this investigation.



☉ = Pollution-sensitive individuals ☉ = Pollution-resistant individuals



38. On the diagram of the flask above, sketch the animals that would be present in flask 3 after several generations of breeding in the laboratory.

Evolution Review

39. Explain how the simple animals of Foundry Cove adapted to the polluted water. Your answer must include an explanation of the role of *three* of the following in this process.

- environment
- genetic variation
- selection
- reproduction
- survival of the fittest

40. An insect pest known as the medfly significantly reduced the orange crop in California. Pesticides were used to control the medfly. Using the concept of natural selection, explain how the continued use of a certain pesticide may become ineffective in controlling this fly. Your answer must include the concepts of:

- variation
- adaptive value of a variation (adaptation)
- survival
- reproduction

41. In members of a bird species living on a remote island, the greatest number of beak variations in the population would most likely be found when

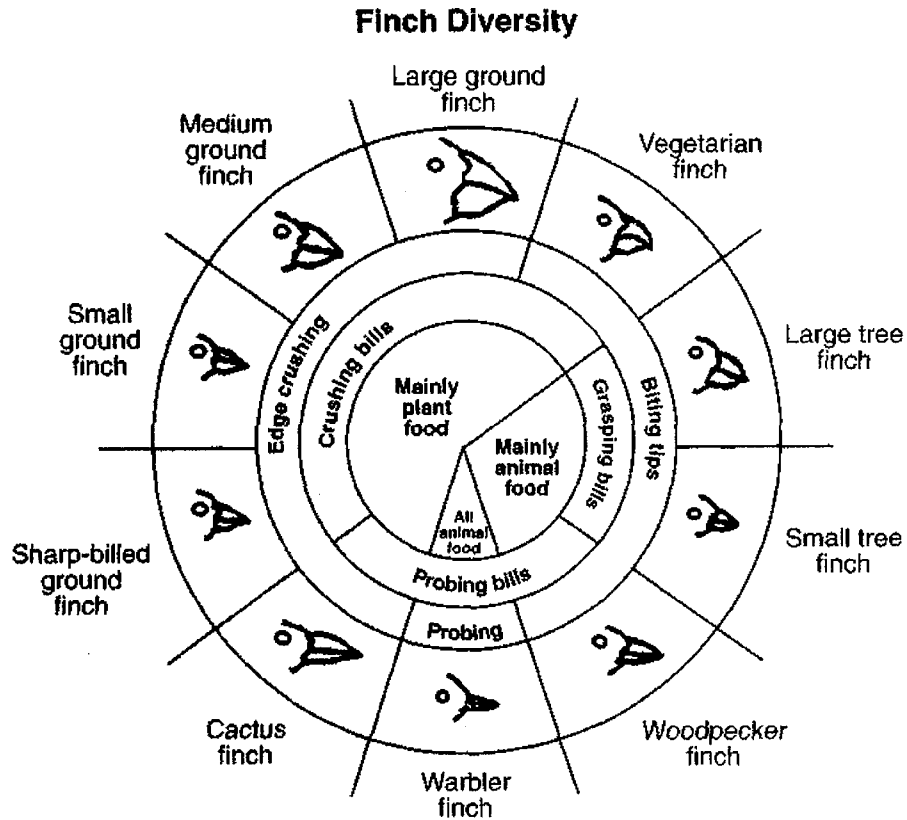
- 1) there is a high level of competition for limited resources
- 2) homeostasis is limited by a severe climate
- 3) they have a large and varied food supply
- 4) they are prey for a large number of predators

42. The different tools used during the beaks of finches lab represented

- 1) feeding adaptations in finches
- 2) nest construction adaptations
- 3) variations in seed size
- 4) variations in ecosystems

Evolution Review

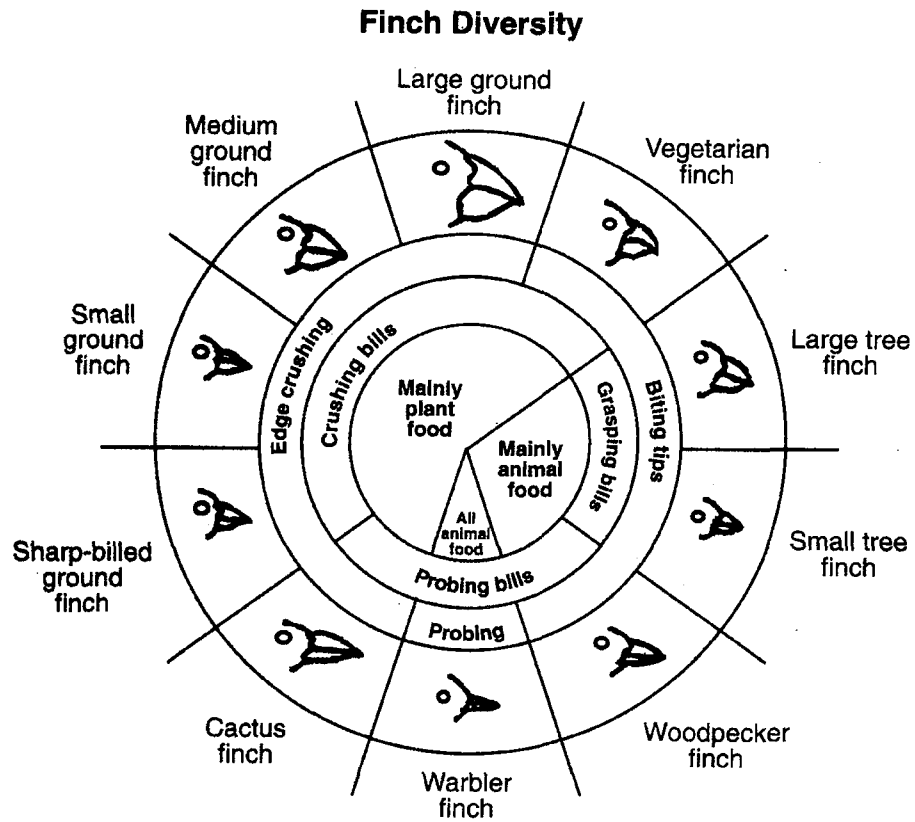
43. The diagram below shows variations in beak sizes and shapes for several birds on the Galapagos Islands.



Using information provided in the chart, identify *two* birds that would most likely compete for food in times of food shortage and explain why they would compete.

Evolution Review

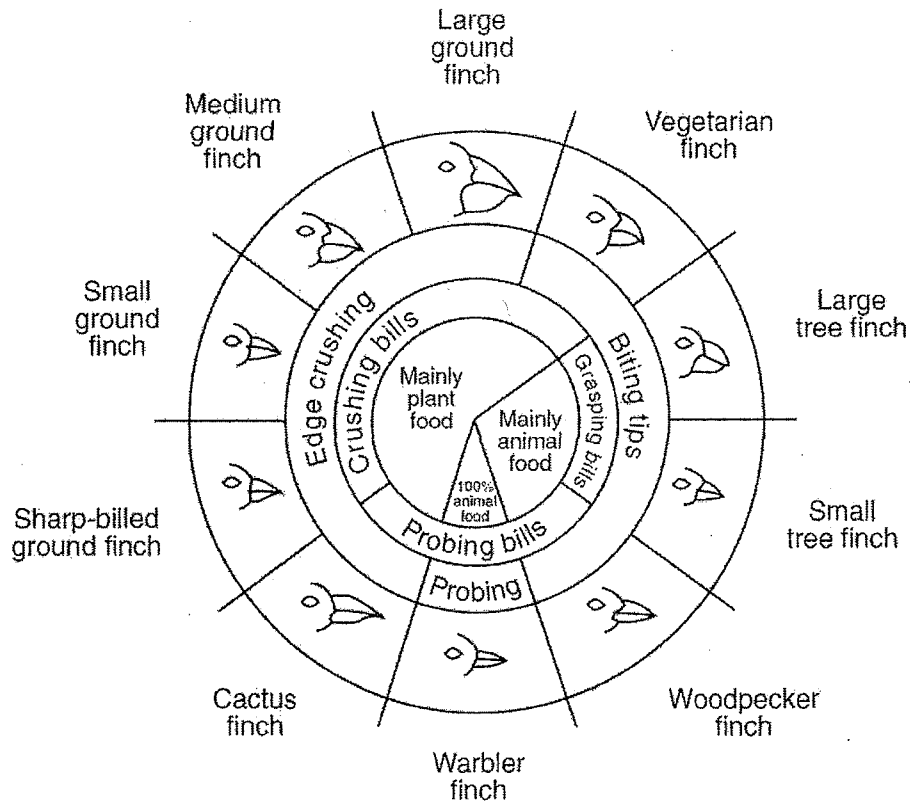
44. Base your answer to the following question on the finch diversity chart below, which contains information concerning the finches found on the Galapagos Islands.



Identify one trait, other than beak characteristics, that would contribute to the survival of a finch species and state one way this trait contributes to the success of this species.

Evolution Review

45. Base your answer to the following question on the diagram below and on your knowledge of biology.



Variations in Beaks of Galapagos Islands Finches

The only finch that is completely carnivorous has a beak adapted for

- | | |
|------------------------------|-----------------------------|
| 1) probing, only | 3) probing and biting |
| 2) probing and edge crushing | 4) biting and edge crushing |

