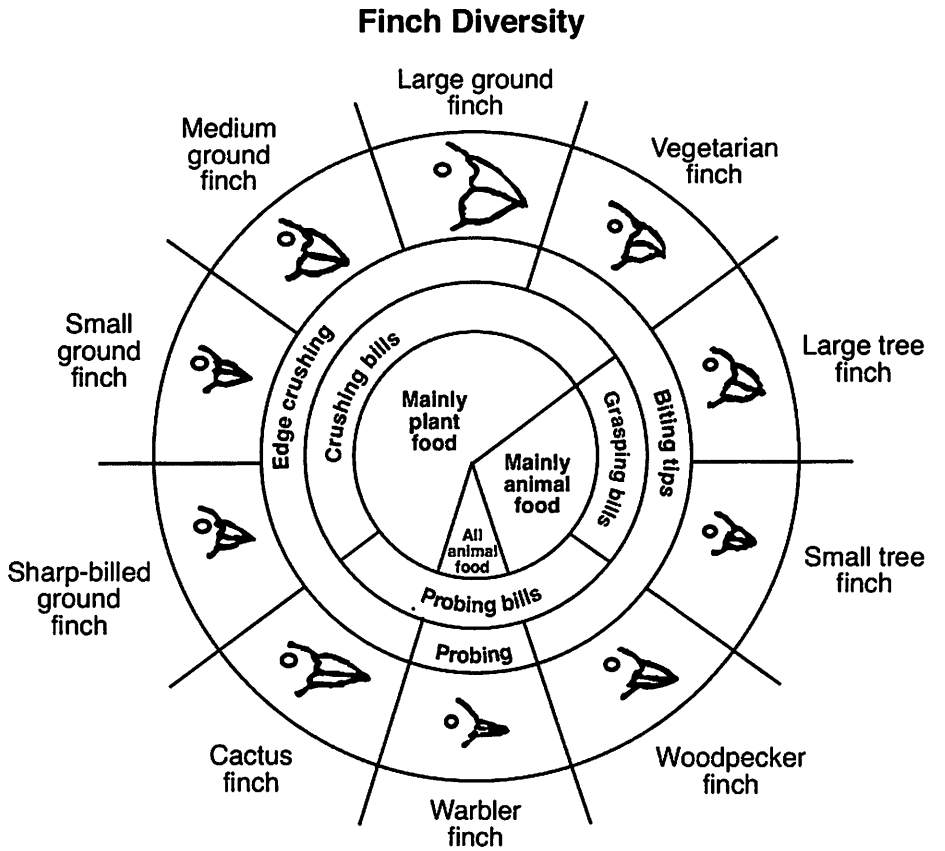
Name:

NY State Lab:
Beaks of Finches

1. Three different species of finch inhabit one particular Galapagos Island. All three species of finch prefer plant food and have edge-crushing bills. Explain how all three species of Finch can live successfully on the same island.

2. Species of finches are represented in the diagram below.



State the name of *one* species of finch from the diagram that is most likely to compete with the small tree finch if they lived on the same island. Support your answer with an explanation.

3. Galapagos finches evolved partly due to
   1) migration and selective breeding
   2) mutation and asexual reproduction
   3) variation and competition
   4) cloning and recombination

4. Even though the finches on the various Galapagos Islands require different biotic and abiotic factors for their survival, these finches would most likely be grouped in the same
   1) species, but found in different habitats
   2) kingdom, but found in different ecological niches
   3) species and found in the same biosphere
   4) population, but found in different ecosystems

5. The different tools used during the beaks of finches lab represented
   1) nest construction adaptations
   2) variations in ecosystems
   3) variations in seed size
   4) feeding adaptations in finches

6. 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) they are prey for a large number of predators
   3) they have a large and varied food supply
   4) homeostasis is limited by a severe climate

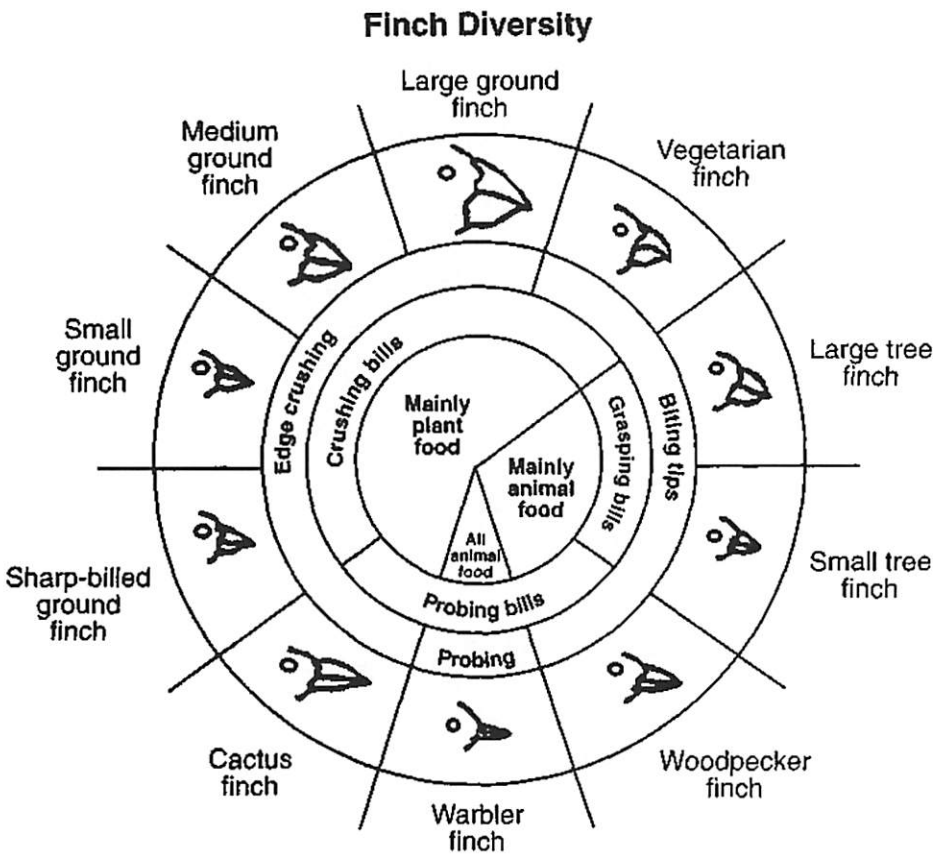
Homework

7. Researchers discovered four different species of finches on one of the Galapagos Islands. DNA analysis showed that these four species, shown in the illustration below, are closely related even though they vary in beak shape and size. It is thought that they share a common ancestor.

Which factor most likely influenced these differences in beak size and shape?

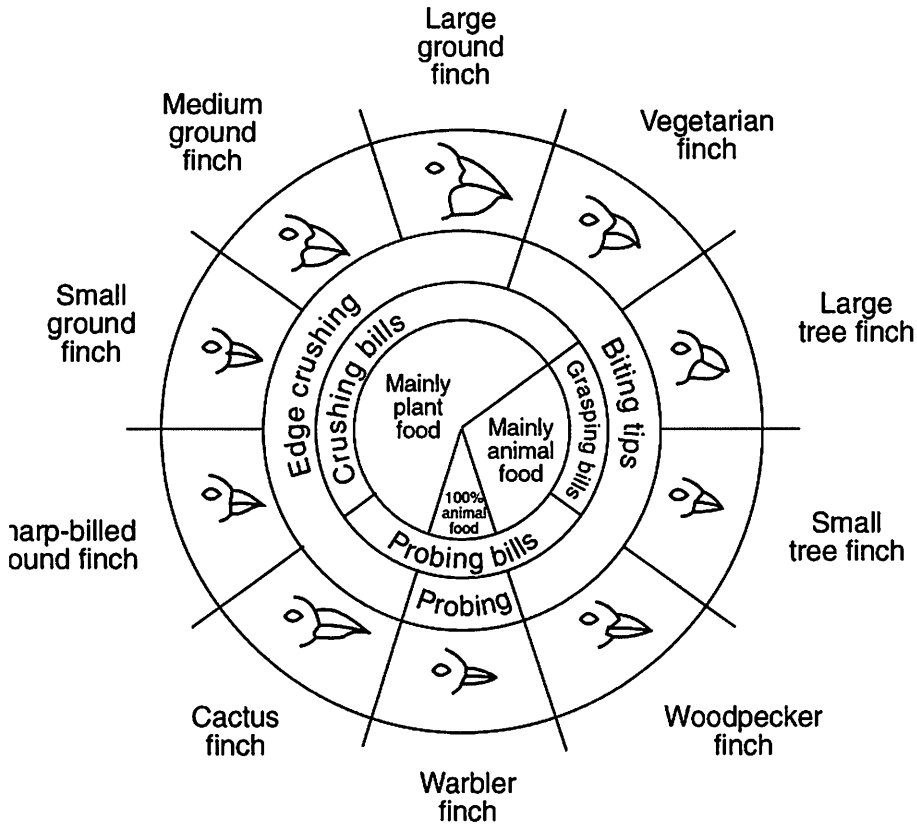
1) Birds with poorly adapted beaks changed their beaks to get food.
2) Birds with successful beak adaptations obtained food and survived to have offspring.
3) Birds with large, sharp beaks become dominant.
4) Birds with yellow beaks were able to hide from predators.

8. 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.

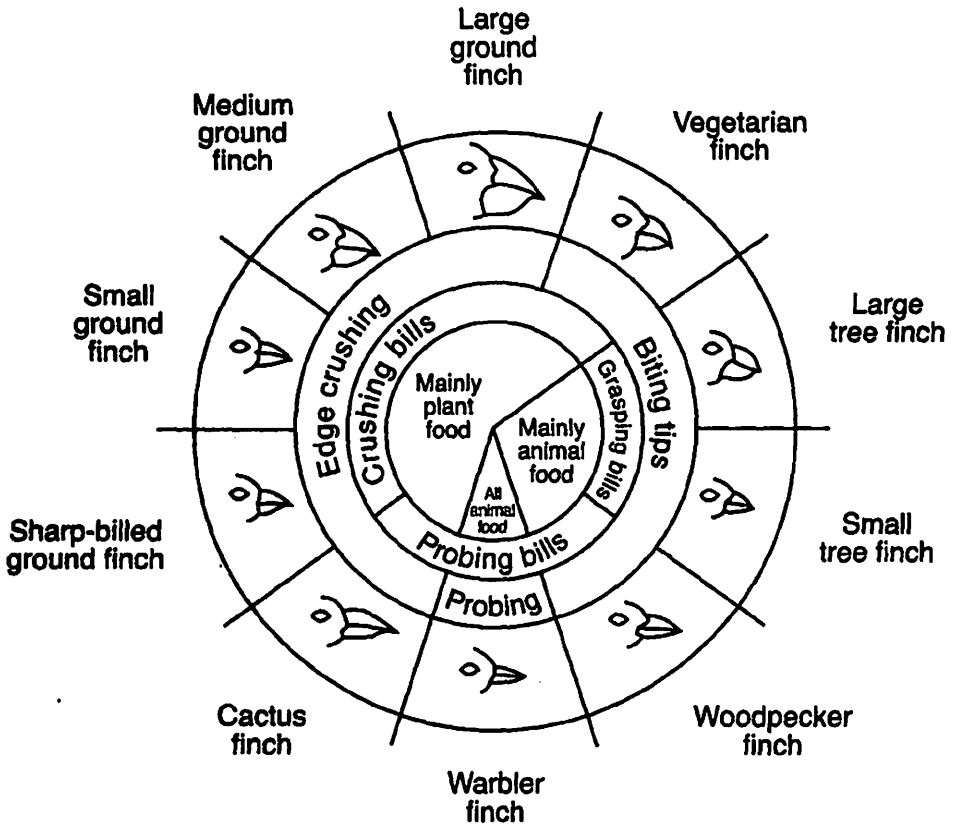
9. The cactus finch, warbler finch, and woodpecker finch all live on one island. Based on the information in the diagram below, which one of these finches is least likely to compete with the other two for food? Support your answer with an explanation.



From: *Galapagos: A Natural History Guide*

Variations in Beaks of Galapagos Islands Finches

Base your answers to questions **10** and **11** on the diagram below that shows variations in the beaks of finches in the Galapagos Islands and on your knowledge of biology.

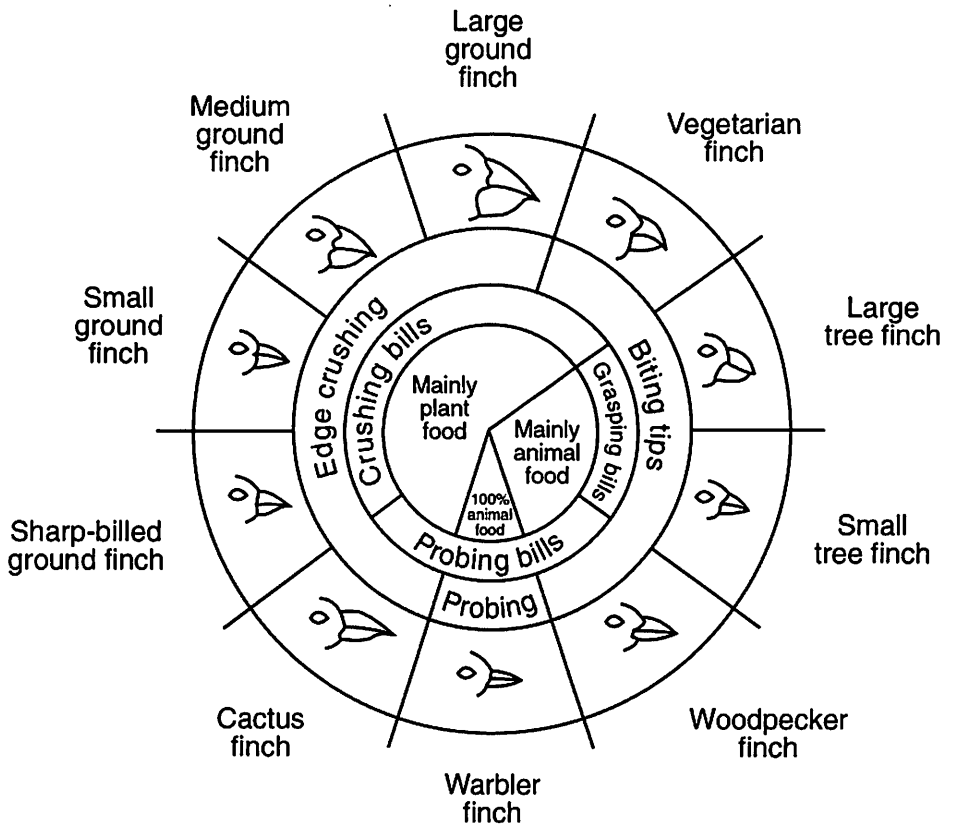


From: *Galapagos: A Natural History Guide*

10. State *one* reason why large ground finches and large tree finches can coexist on the same island.

11. The diversity of species seen on the Galapagos Islands is mostly due to
    1) gene changes resulting from mitotic cell division
    2) natural selection
    3) gene manipulation by scientists
    4) selective breeding

Base your answers to questions **12** and **13** on the diagram below and on your knowledge of biology.

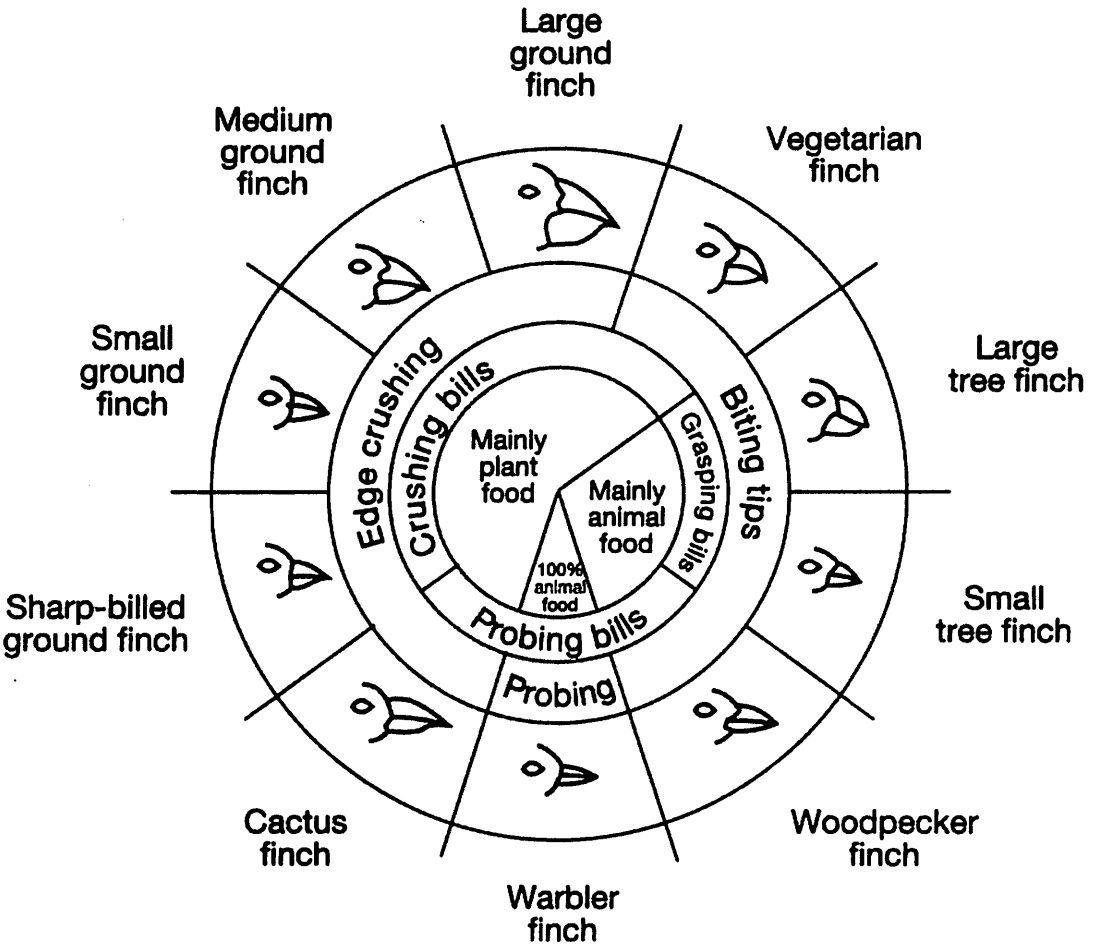


Variations in Beaks of Galapagos Islands Finches

12. The only finch that is completely carnivorous has a beak adapted for
    1) probing and edge crushing
    2) probing, only
    3) biting and edge crushing
    4) probing and biting

13. Which two finches would compete the *least* for food?
    1) small tree finch and medium ground finch
    2) vegetarian finch and small ground finch
    3) small ground finch and large ground finch
    4) large ground finch and sharp-billed ground finch

Base your answers to questions **14** and **15** on the information below and on your knowledge of biology. The diagram below represents the relationship between beak structured and food in several species of finches in the Galapagos Islands.



From: *Galapagos: A Natural History Guide*

Variations in Beaks of Galapagos Islands Finches

14. Which factor most directly influenced the evolution of the diverse types of beaks of these finches?
    1) available food sources 2) predation by humans 3) oceanic storms 4) lack of available niches

15. State *one* reason why the large tree finch and the large ground finch are able to coexist on the same island.

_____

Base your answers to questions **16** and **17** on the data table below and on your knowledge of biology.

Dietary Preferences of Finches

Species of Finch	Preferred Foods
A	nuts and seeds
B	worms and insects
C	fruits and seeds
D	insects and seeds
E	nuts and seeds

16. Based on its preferred food, species B would be classified as a
    1) decomposer
    2) parasite
    3) carnivore
    4) producer

17. Which two species would most likely be able to live in the same habitat without competing with each other for food?
    1) B and C
    2) C and E
    3) A and C
    4) B and D

Base your answers to questions **18** through **20** on the information below and your knowledge of biology.

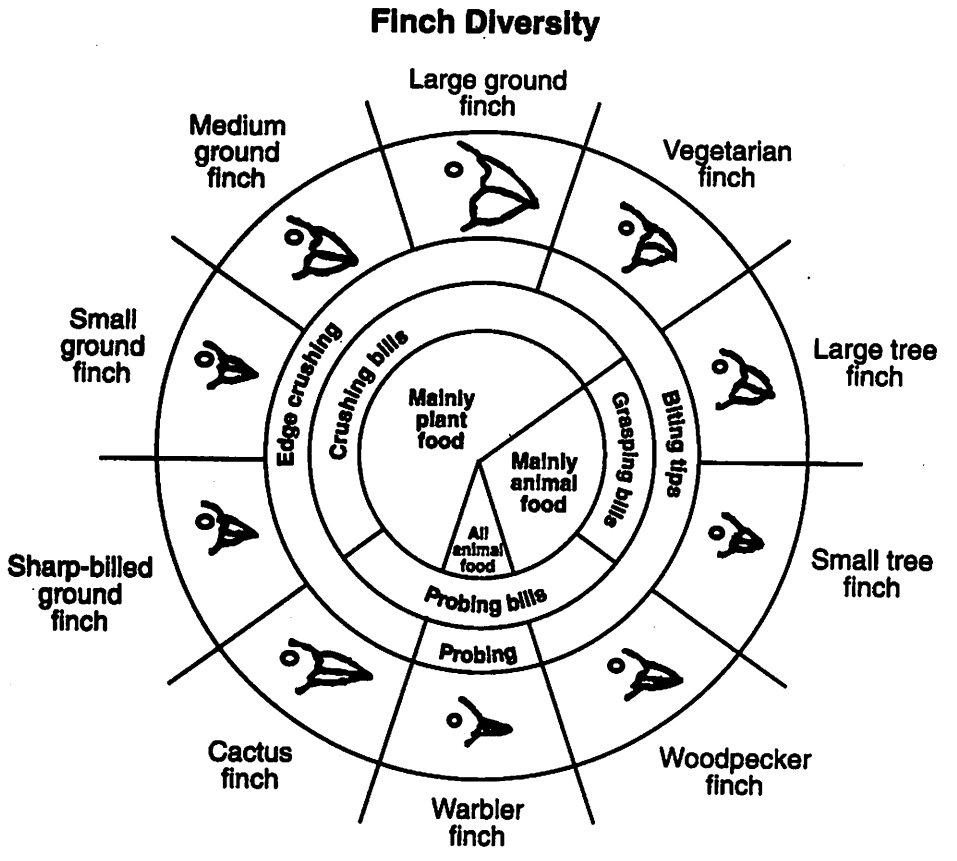
In the Beaks of Finches laboratory activity, students were each assigned a tool to use to pick up seeds. In round one, students acting as birds used their assigned tools to pick up small seeds from their own large dishes (the environment) and place them in smaller dishes (their stomachs). The seeds collected by each student were counted. Some students were able to collect many seeds, while others collected just a few. In round two, students again used their assigned tools to collect seeds. This time several students were picking up seeds from the same dish of seeds.

18. One factor that influences the evolution of a species that was not part of this laboratory activity is
    1) struggle for survival
    2) competition
    3) overproduction
    4) variation

19. Explain how this laboratory activity illustrates the process of natural selection.

20. Identify *one* trait, other than beak characteristics, that could contribute to the ability of a finch to feed successfully.

Base your answers to questions **21** through **23** on the finch diversity chart below, which contains information concerning the finches found on the Galapagos Islands.



21. Identify *one* bird that would most likely compete for food with the large tree finch. Support your answer.

22. Identify one bird that would most likely compete for food with the large tree finch. Support your answer.

23. 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.

Base your answers to questions **24** and **25** on the information below and on your knowledge of biology.

Evolutionary changes have been observed in beak size in a population of medium ground finches in the Galapagos Islands. Given a choice of small and large seeds, the medium ground finch eats mostly small seeds, which are easier to crush. However, during dry years, all seeds are in short supply. Small seeds are quickly consumed, so the birds are left with a diet of large seeds. Studies have shown that this change in diet may be related to an increase in the average size of the beak of the medium ground finch.

24. In exceptionally dry years, what most likely happens in a population of medium ground finches?
    1) There is increased competition for a limited number of small seeds.
    2) The finches develop parasitic relationships with mammals.
    3) Birds with large beaks prey on birds with small beaks.
    4) There is increased cooperation between the birds.

25. The most likely explanation for the increase in average beak size of the medium ground finch is that the
    1) birds acquired larger beaks due to the added exercise of feeding on large seeds
    2) lack of small seeds caused a mutation which resulted in a larger beak
    3) trait is inherited and birds with larger beaks have greater reproductive success
    4) birds interbred with a larger-beaked species and passed on the trait

Base your answers to questions **26** and **27** on the information below and on your knowledge of biology.

In birds, the ability to crush and eat seeds is related to the size, shape, and thickness of the beak. Birds with larger, thicker beaks are better adapted to crush and open seeds that are larger. One species of bird found in the Galapagos Islands is the medium ground finch. It is easier for most of the medium ground finches to pick up and crack open smaller seeds *rather than* larger seeds. When food is scarce, some of the birds have been observed eating larger seeds.

26. Explain this long-term change in beak characteristics using the concepts of:

    • competition
    • survival of the fittest
    • inheritance

27. Describe *one* change in beak characteristics that would most likely occur in the medium ground finch population after many generations when an environmental change results in a permanent shortage of small seeds.

Base your answers to questions **28** through **30** on the passage below and on your knowledge of biology.

When Charles Darwin traveled to the Galapagos Islands, he observed 14 distinct varieties of finches on the islands. Darwin also observed that each finch variety ate a different type of food and lived in a slightly different habitat from the other finches. Darwin concluded that the finches all shared a common ancestor but had developed different beak structures.

28. The different beak structures mentioned in the last sentence were most likely influenced by
    1) abnormal mitotic cell division
    2) characteristics that are acquired during the bird's lifetime
    3) selection for favorable variations
    4) environmental conditions identical to those of the common ancestor

29. The 14 varieties of finches are most likely the result of
    1) asexual reproduction 2) biological evolution 3) absence of biodiversity 4) lack of competition

30. The second sentence best describes
    1) a niche
    2) an ecosystem
    3) a food web
    4) a predator/prey relationship