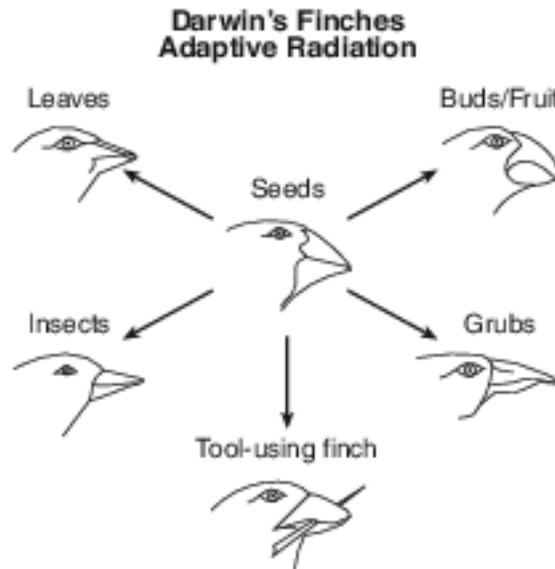


Lab The Beaks Of Finches

Base your answers to questions 1 on the information and diagram below and on your knowledge of biology.

Finches on the Galapagos Islands are thought to have originated from South America and to have evolved into new species over the last 10,000 years. Some of this evolution is represented in the diagram below.



- 1 The success of the finches on the Galapagos was most likely due to the
- | | |
|---|--|
| (1) large numbers of other birds competing for food | (3) birds occupying the same island |
| (2) mutations occurring in every offspring | (4) birds adapting to different niches |

Base your answers to questions 2 on the information and chart below and on your knowledge of biology.

The Galapagos Islands are home to many different species of finches. Three finch species, their relative beak sizes, and their food preferences are represented below. All three species live on the same island.

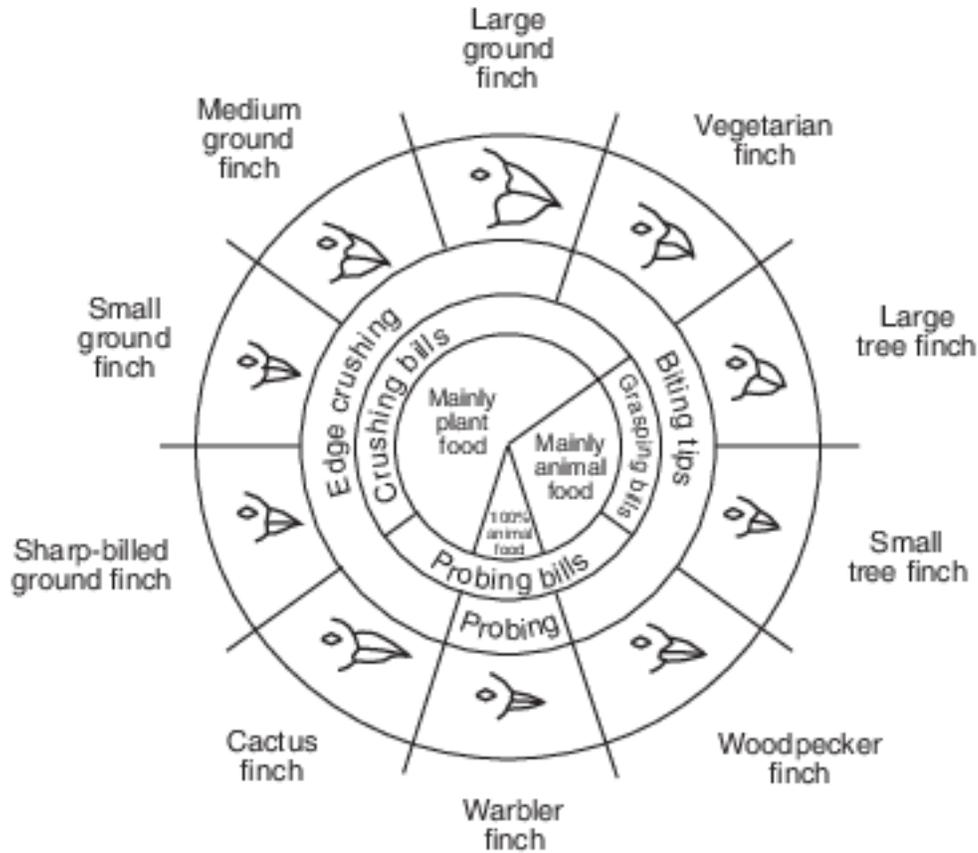
Three Galapagos Finches and Their Sources of Nutrition

Name	Foods
Vegetarian finch <i>Platyspiza crassirostris</i> 	Buds, leaves, fruit of trees 
Warbler finch <i>Certhidea olivacea</i> 	Flying and ground-dwelling insects 
Cactus finch <i>Geospiza scandens</i> 	Cactus flowers and nectar 

- 2 Which statement is correct concerning the nutritional preferences of these finches?
- (1) The three species do not compete for food because they eat different types of foods.
 - (2) The vegetarian and cactus finches compete for food because they both feed on producers.
 - (3) The vegetarian and warbler finches compete for food because they both live in trees.
 - (4) The three species of finches compete for food because their beaks are similar in shape and size.

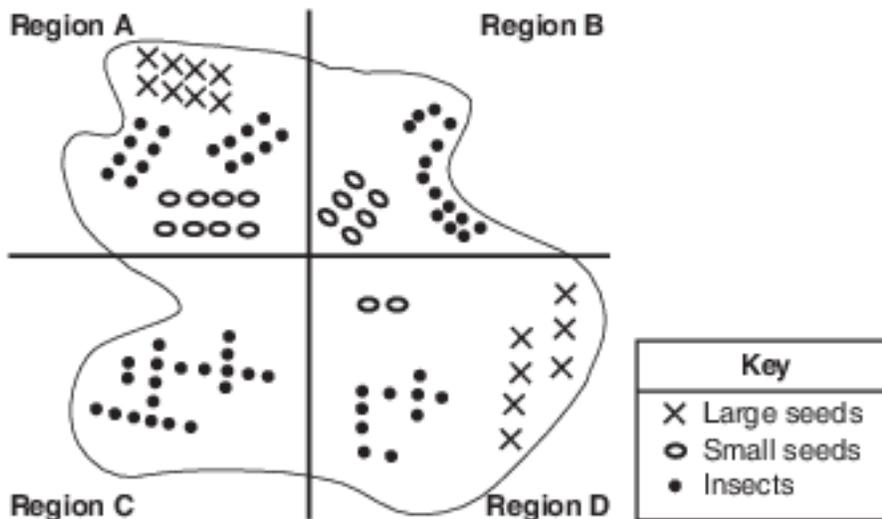
Base your answers to questions 3 on the diagrams below and on your knowledge of biology. The diagrams represent the variations in the beaks of finches in the Galapagos Islands and the relative abundance of food sources on a certain island.

Variations in Beaks of Galapagos Islands Finches



From: Galapagos: A Natural History Guide

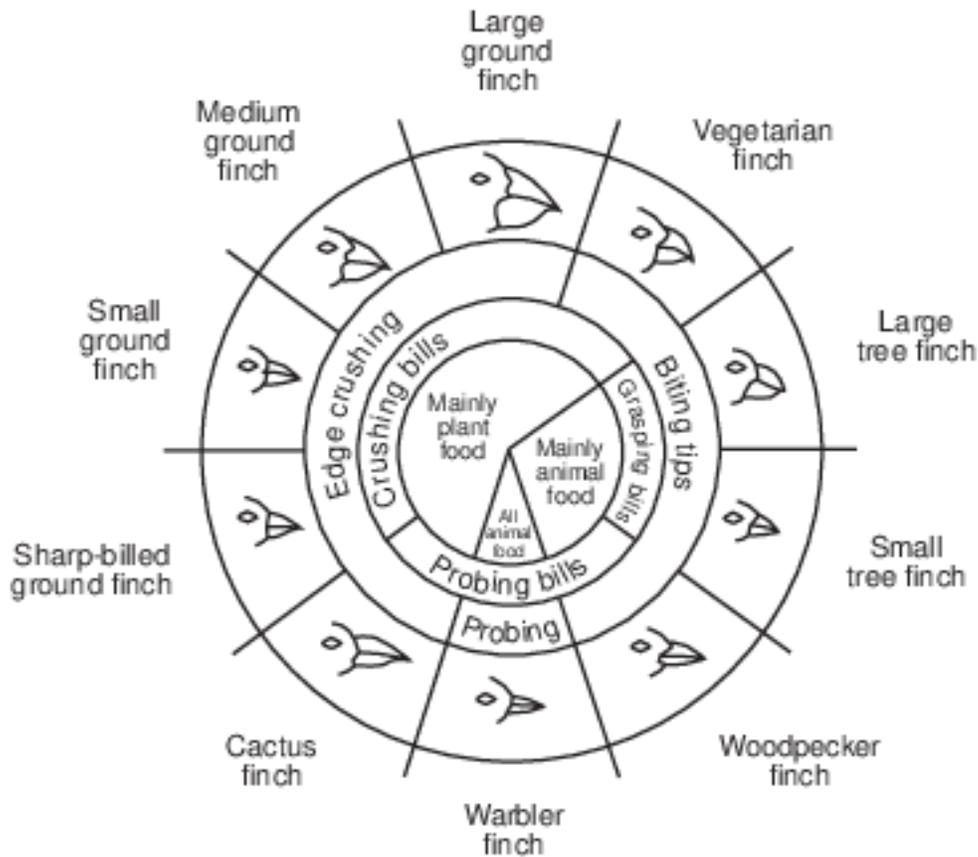
Relative Abundance of Food Sources on a Certain Island



- 3 The diagram of the island suggests that in region B finches can feed on
- (1) large seeds and insects
 - (2) small seeds, only
 - (3) a large variety of different-sized seeds
 - (4) insects and a limited number of small seeds

Base your answers to questions 4 on the information in the diagram below and on your knowledge of biology.

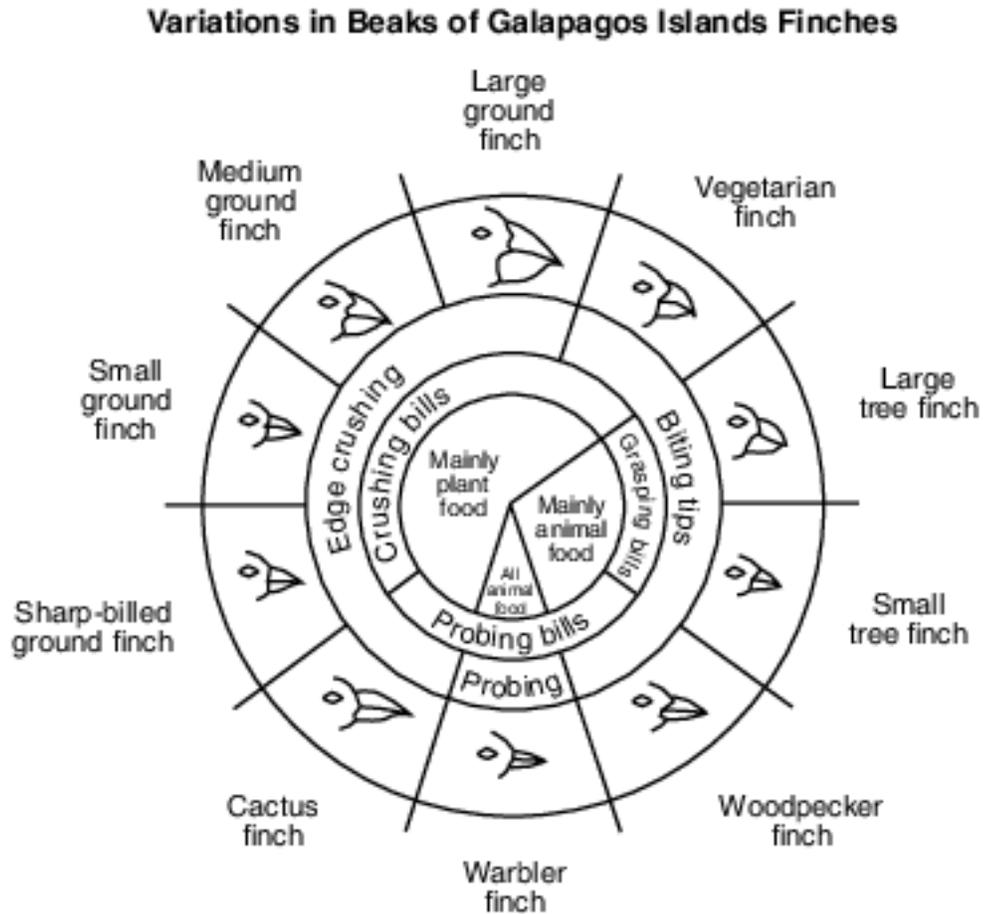
Variations in Beaks of Galapagos Islands Finches



from: Galapagos: A Natural History Guide

- 4 Based on the information in the chart, which statement is correct?
- (1) Finches that eat animals always have larger beaks than finches that eat plants.
 - (2) Finches that eat plants all have very large beaks.
 - (3) Finches with crushing bills eat only animals for food.
 - (4) Finches with grasping bills usually eat animals for food.

5 The diagram below represents the relationship between beak structure and food in several species of finches found on the Galapagos Islands.



The different beak structures observed in the diagram are evidence of

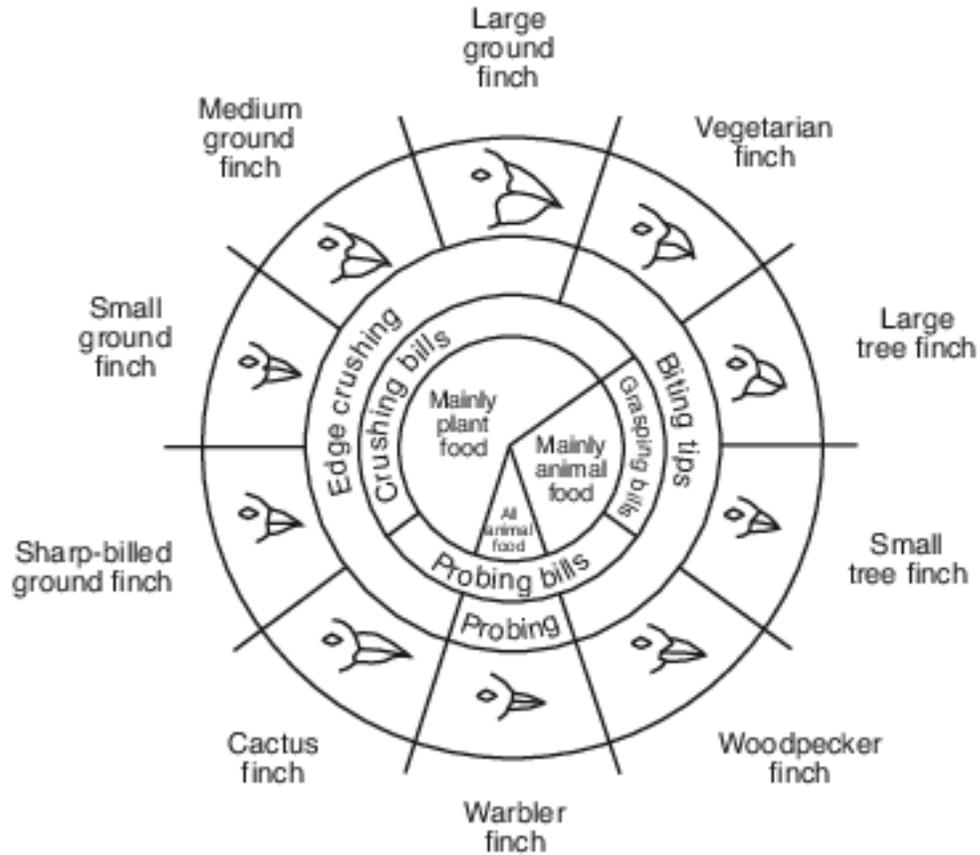
- (1) different species of finches adapting to different environments over many generations
- (2) finches changing their beak characteristics so that they could feed efficiently
- (3) finch species with different beak structures coming to the Galapagos Islands from the mainland
- (4) finches mating with birds of other species and acquiring some of their traits

6 Certain chemicals, such as cytochrome C, are found within cells of all living organisms. The biochemical structure of cytochrome C in ground finches and in tree finches is very similar. This suggests that tree finches and ground finches have

- | | |
|-----------------------|------------------------------|
| (1) identical DNA | (3) evolved at the same time |
| (2) a common ancestor | (4) the same nesting site |

Base your answers to questions 7 on the diagram below and on your knowledge of biology.

Variations in Beaks of Galapagos Islands Finches

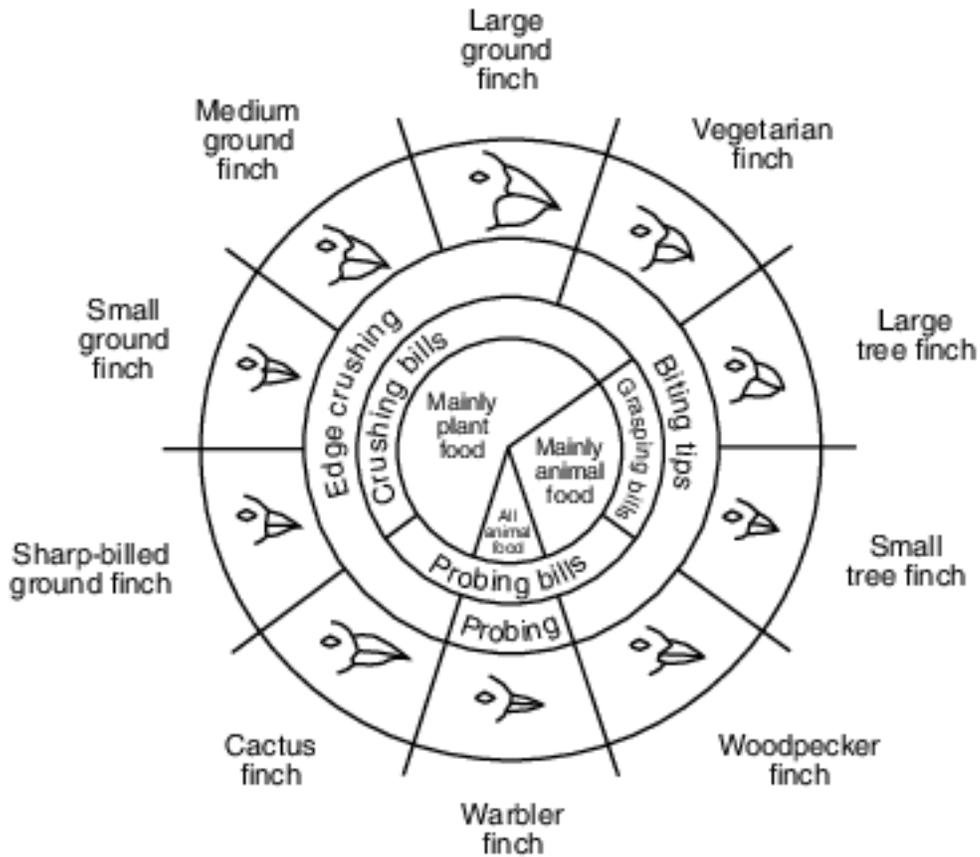


from: *Galapagos: A Natural History Guide*

- 7 Which species of finch has an edge-crushing bill that can also probe into plants for food?
- (1) cactus finch
 - (2) sharp-billed ground finch
 - (3) warbler finch
 - (4) large ground finch

Base your answers to questions 8 on the diagram below and on your knowledge of biology.

Variations in Beaks of Galapagos Islands Finches



from: *Galapagos: A Natural History Guide*

- 8 On an island populated by both warbler finches and small tree finches, there is a significant decrease in the amount of animal food. Which finch population would decrease more? Support your answer. [1]

Finch population: _____

Base your answers to questions 9 on the information below and on your knowledge of biology.

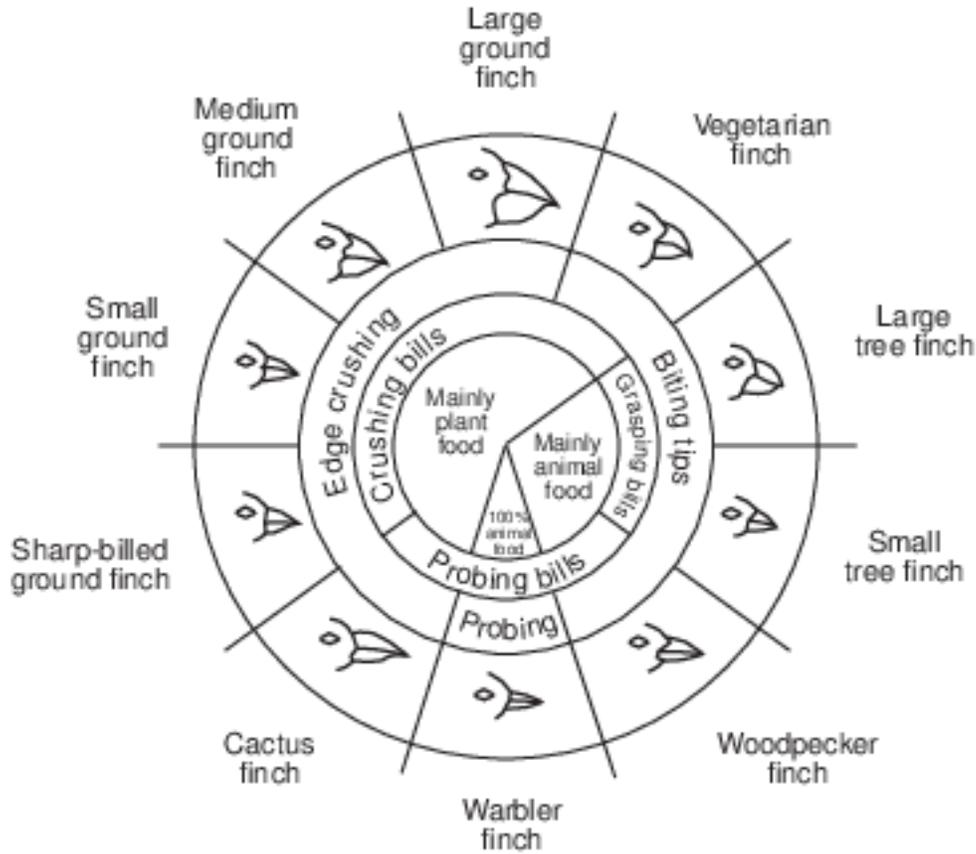
The chart describes the beaks of various types of birds that live in a small island ecosystem containing flowering land plants, aquatic plants, many small mammals, amphibians, and several species of trees.

Beak Shape	Beak Type	Adaptation and Use
	Cracker	Seed eaters like sparrows and cardinals have short, thick beaks for cracking seeds.
	Shredder	Birds of prey like hawks and owls have sharp, curved beaks for tearing meat.
	Chisel	Woodpeckers have beaks that are long and chisel-like for boring into wood to eat insects.
	Probe	Hummingbirds have beaks that are long and thin for probing flowers for nectar.
	Strainer	Some ducks have long, flat beaks that strain small plants and animals from the water.

9 Identify the beak type that would be characteristic of predators of small mammals. [1]

Base your answer to question 10 on the diagram below and on your knowledge of biology.

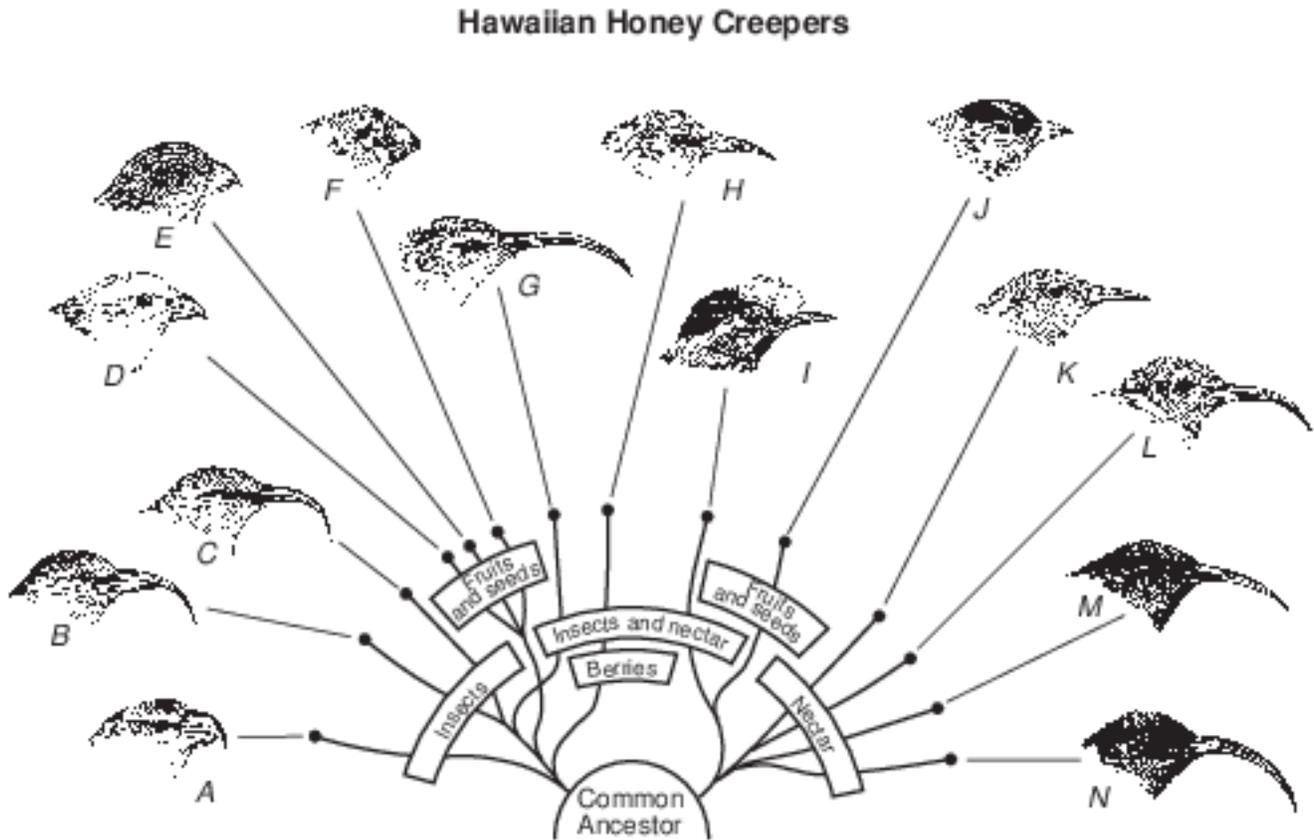
Variations in Beaks of Galapagos Islands Finches



From: Galapagos: A Natural History Guide

- 10 There are a number of islands in the Galapagos that these finches could possibly inhabit. Explain why each island would not be expected to have all of the species shown. [1]
- 11 Identify one trait, other than a beak characteristic, that could affect the survival of a finch. Support your answer. [1]

Base your answers to questions 12 on the diagram below, which shows the evolution of Hawaiian Honey Creepers from a common ancestor. As their ancestors spread to new islands, they found a variety of different food sources. Gradually, behaviors and beak structures evolved that took advantage of these different food sources, resulting in the formation of several new species.

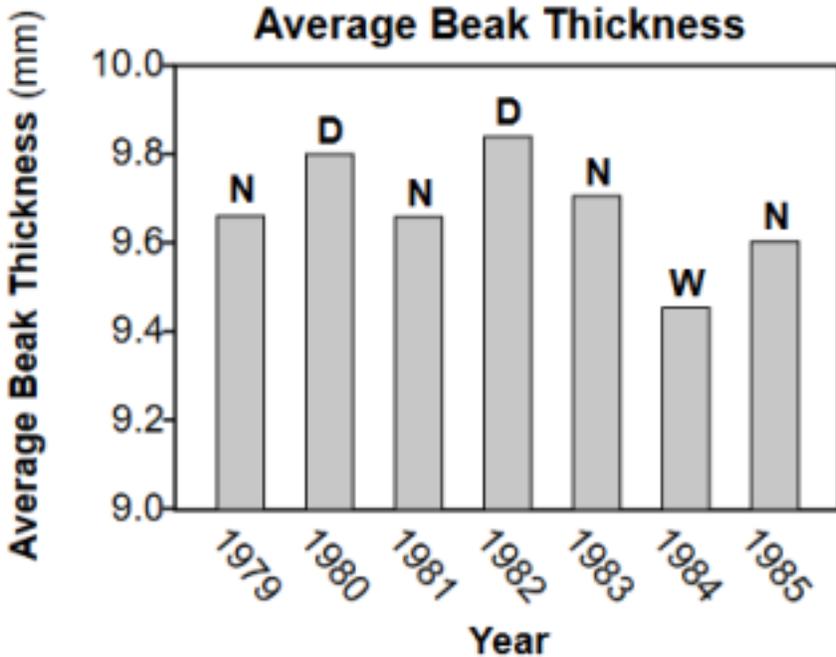


- 12 Describe how the beaks of the bird species D, E, F, and J that eat fruits and seeds differ from the beaks of the bird species that eat only nectar. [1]
- 13 Identify one adaptation, other than beak size and shape, a finch species might possess and state how that would aid in its survival. [1]
- 14 A certain small population of finches already has an “ideal” beak type for its present environment. Describe two specific adaptations, other than beak type, that would contribute to the ability of these finches to survive. [1]

Base your answers to questions 15 on the information and graph below and on your knowledge of biology.

A species of bird lives on an island. Beak thickness varies within the population. The birds feed mainly on seeds. Birds with smaller beaks can eat only small seeds. Only birds with larger beaks are able to crush and eat large seeds.

During years with more rain, small seeds are abundant. During dry years, there are very few small seeds, but there are many large seeds.



Key	
N	= year with normal rainfall
W	= year with above-normal rainfall (wet)
D	= year with below-normal rainfall (dry)

Source: mdk12.org/assessments

15 Predict how the average beak thickness would be expected to change after 1985 if there were eight very dry years in a row. Support your answer. [1]

Answer Keys

1 4

2 1

3 4

4 4

5 1

6 2

7 1

- 8 Allow 1 credit for warbler finch and supporting the answer. Acceptable responses include, but are not limited to:
- not limited to:
 - — Small tree finches may eat some plant food, while warbler finches eat only animal food.
 - — Warbler finches eat only animal food, while small tree finches may eat some plant food.

- 9 Allow 1 credit. Acceptable responses include, but are not limited to:
- — shredder
 - — sharp, curved beak

- 10 Allow 1 credit. Acceptable responses include, but are not limited to:
- — Each island has its own set of environmental conditions which might not provide food or shelter for some of these species.
 - — Different islands might have different kinds of food available.
 - — too much competition

- 11 Allow 1 credit for identifying one trait, other than beak characteristic, that could affect the survival of a finch and supporting the answer. Acceptable responses include, but are not limited to:
- Coloration:
 - — Camouflage would help survival.
 - — attract a mate for successful reproduction
 - Strength:
 - — helps in competition for food
 - Aggressiveness:
 - — helps in competition for mate/food

- 12 Allow 1 credit. Acceptable responses include, but are not limited to:
- — Fruit and seed eaters have shorter, thicker beaks.
 - — The nectar-eating birds have longer, thinner beaks.
 - — Their beaks are shorter.

- 13 Allow 1 credit. Acceptable responses include, but are not limited to:
- Adaptation: fast flight speed
 - — to escape predators
 - Adaptation: camouflage
 - — to hide from predators
 - Adaptation: eyesight
 - — to locate food
 - Adaptation: mating behavior (songs)
 - — to attract mates

- 14 Allow 1 credit for two adaptations. Acceptable responses include, but are not limited to:
- — better eyesight to locate food
 - — ability to produce more offspring
 - — ability to fly faster
 - — resistance to diseases in the area
 - — ability to tolerate hot/cold temperatures
- 15 Allow 1 credit for predicting how the average beak thickness would be expected to change and supporting the answer with information from the graph. Acceptable responses include, but are not limited to:
- — The average thickness of the beaks would be around or greater than 9.8 mm, as it was in the two dry years shown in the graph.
 - — The average thickness would increase since the beaks were thicker in the dry years shown in the graph.
 - — During dry years (1980 and 1982), the beaks were thicker. After a series of dry years, beaks would be thicker.