Evolutionary Principles: Darwin’s Finches

*Part 1: watch “The Origin of Species: the Beak of the Finch” and answer the following questions.*

Using arrows, match the food source to the beak type best suited for it.

Needle-like

Rounded, robust

Long, sharp, pointy

Large

Small

Cactus flowers

Large seeds

Beetle and termite larvae

Small seeds

Insects

Which is more likely: that many species of finches came to the Galapagos, or all of these species evolved from one species of finch? What evidence supports your claim?

It is more likely that all of these species evolved from one species of finch, because all\_\_\_\_ thirteen species are more related to each other than to any other species of finch.\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Figure 1 shows the beak depths of the entire population of medium ground finches on Daphne Major in 1976; those that survived a major drought are in black. Figure 2 shows the beak depths of the survivor’s offspring in 1978 after the drought.

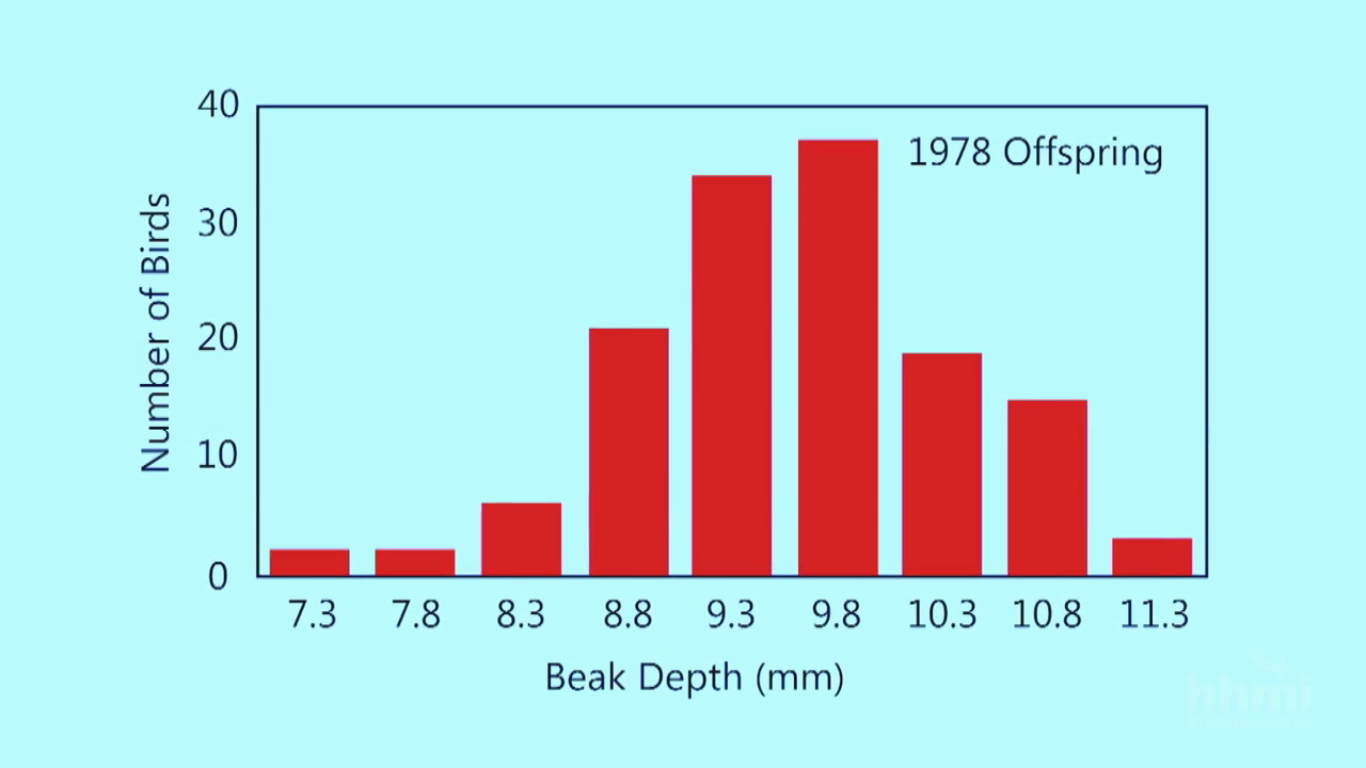
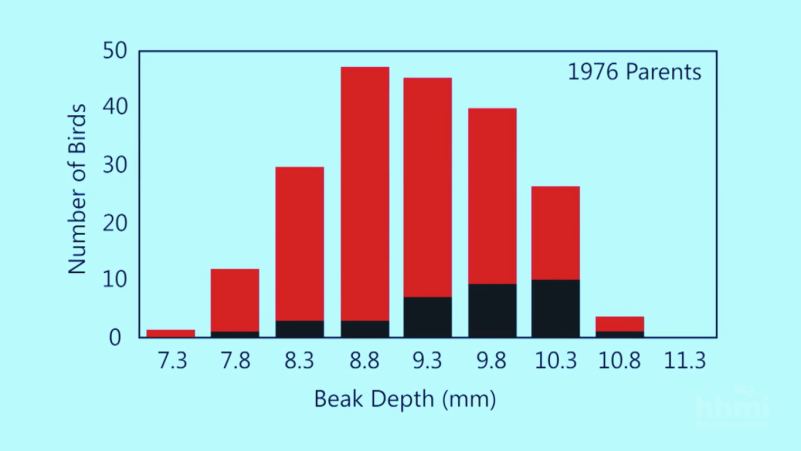
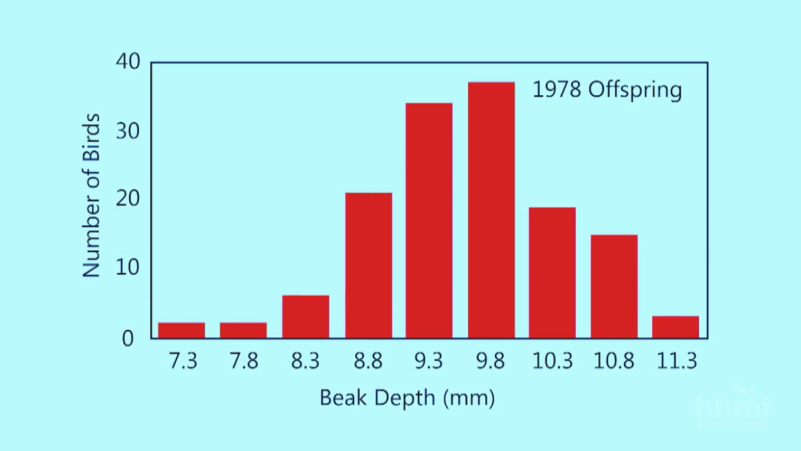
 

Figure 1. Beak depths of parents.

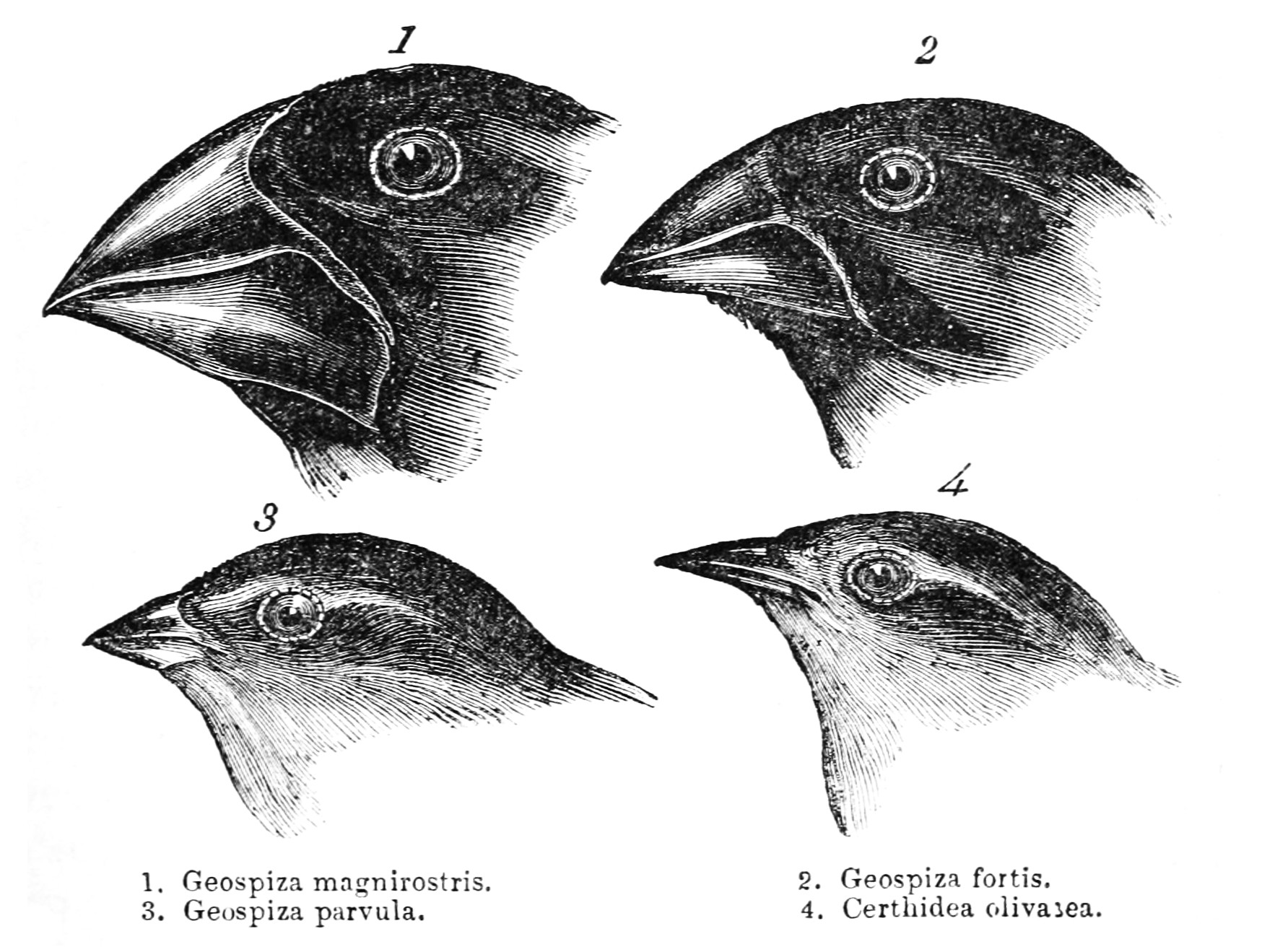
Figure 2. Beak depths of offspring.

Explain how these two figures demonstrate natural selection.

Since more birds with larger beaks than smaller beaks were able to eat, over time the large beak was selected for. This resulted in a shift in the mean beak depth. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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*Part 2: using the figure below and background knowledge from the video, answer the following questions.*



Only eat small insects.

Only eat beetle larvae.

One eat large nuts.

Only eat small, soft seeds.

*Wolf Island- only has tall, woody plants that produce large nuts.*

*Darwin Island- has mostly small shrubs that produce small seeds; some tall, woody plants that produce large nuts.*

*Santa Isabela Island- has small shrubs that produce small seeds, and an abundance of beetles and small insects.*

1. These four finches all live on different islands with different food sources. On Santa Isabela Island, a parasite has wiped out many of the small insects. Which species will be most affected, and how might the population respond after several generations?

Finch 4 will be most affected; the birds might fly to another island to find food, slowly die out, or adapt to a different food source.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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2. Separate populations of the Finch 1 species live on Wolf Island and on neighboring Darwin Island. On Darwin Island, a drought for the past few years caused plants with large nuts to die off, but the Wolf Island population escaped the drought.

a. What might be some differences between the Finch 1 population on Wolf Island and the Finch 1 population on Darwin Island?

The population on Darwin island might eat another food source than the population on Wolf Island, such as smaller seeds. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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b. If Finch 1 individuals begin to migrate between Wolf and Darwin islands, what do you expect will happen to the differences between the Finch 1 populations over time?

If they keep migrating back and forth, gene flow would make the two populations more and more similar to each other over time .\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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3. Some members of the Finch 2 species fly from Santa Isabela Island to Wolf Island, where a Finch 1 population resides. What do you expect will happen to the Finch 2 population on Wolf Island over time?

Since the Finch 1 species eats large nuts, it is reasonable to assume that that is the most prevalent food source in Wolf Island. The Finch 2 population on Wolf Island will either go extinct or evolve to have larger beaks.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Some members of the Finch 2 species fly from Santa Isabela Island to Wolf Island, where a Finch 1 population resides. Due to overcrowding, some members of the Finch 1 species fly from Wolf Island to Santa Isabela Island.

a. What are some characteristics of these finches that you could measure to evalueate their fitness, or how well they are performing in their current environment?

Answers will vary; possible answers include number of offspring, weight, feather status, population size, etc.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. Which finch species will likely perform best on Wolf Island? On Santa Isabela Island? Represent your answer graphically.

Two possible solutions:

Number of Offspring

Species 2

Species 1

Species 1

Species 2

c. On which island will the Finch 1 species likely perform best? Finch 2? Represent your answer graphically.

Two possible solutions:

Number of Birds

5. Some members of Finch 3 migrate across Santa Isabela Island and lose contact with the rest of the population. Conditions on this side of the island are much different; these members and their offspring begin eating small seeds. Years later, researchers attempt to mate one of these members with one of the original Finch 3 members. Do you believe they will mate? Why or why not?

They will likely mate; even though the new Finch 3 population is now locally adapted to its new surroundings, they are still part of the same species as the original Finch 3 population. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Some members of Finch 3 migrate across Santa Isabela Island and lose contact with the rest of the population. Conditions on this side of the island are much different; these members and their offspring begin eating small seeds, **and** develop a different mating call. Years later, researchers attempt to mate one of these members with one of the original Finch 3 members. Do you believe they will mate? Why or why not?

They will not mate; since they likely will not respond to each other’s calls, these two populations are probably two different species now.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_