

Speciation in Galapagos Finches

In the previous activity, we learned that the Grants' work demonstrated that finch beak size has changed by natural selection. If we extend that idea, we might be able to explain how natural selection can lead to speciation. To do that, we'll begin with a hypothetical population of finches that arrived on the islands as founders.

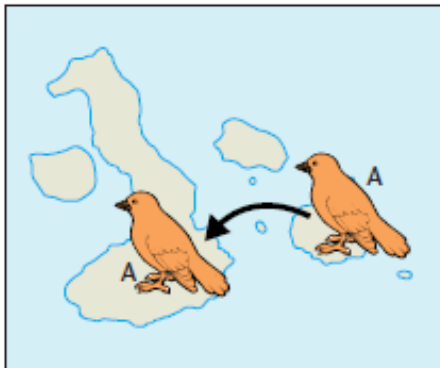
Step 1 – Founders Arrive



A long time ago, a group of finches (we'll call them species A) arrived on the Galapagos Islands from the South American mainland. Finches are small birds that don't normally fly far over open water. Once they got to the islands, they were able to survive and reproduce.

1. [SP 1, SP 2] Describe a way the finches could have made it from South America to the islands.

Step 2 – Geographic Isolation



Sometime after the arrival of the founding population, some birds from that original population managed to get to another island in the group. Remember, these small birds rarely fly far across open water, so they would be unlikely to travel between islands.

2. [SP 1] Explain the significance of the fact that the finches do not often move between islands.

3. [SP 1, SP 2] Identify the isolating mechanism at work in this case and provide reasoning for your response.

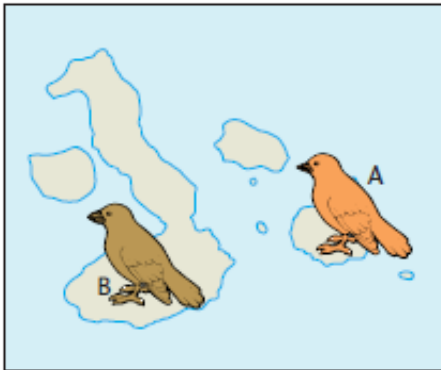
4. [SP 6] Make a prediction about what you expect to happen to the two populations over time.

Step 3 – Changes in the Gene Pool

Natural selection results in individuals with favorable traits having greater reproductive success and becoming more common, changing the gene pool.

5. [SP 1, SP 6] In order for the two populations to diverge, the environment on the two islands would have to be different. Even though the islands are close together, suggest one way the environments might differ and how that difference might affect the finches.

Step 4 – Reproductive Isolation



As the two populations continue to evolve, eventually speciation would occur and the birds on the second island would be considered a separate species (let's call them species B). Part of the courtship behavior of finches involves closely inspecting the beak of a potential mate. Individuals tend to mate with birds that have a beak similar to their own.

6. a) [SP 2, SP 6] Imagine that a few birds from the second island cross back to the first island. Based on what you learned in the previous paragraph, predict what would happen when birds of the two species inhabit the same area. Justify your response.

b) [SP 1] Identify the isolating mechanism that would account for your response to (a).

Step 5 – Continued Evolution

As the two new species continue to live together in the same habitat (on the first island), they would have to compete with one another for food. If a finch eats a very specialized type of seed, it would have less competition from other species. This would contribute to continued change among finches as natural selection favored traits that were favorable in a given habitat.

7. [SP 1, SP 6] Today, there are 13 different species of finch found on the Galapagos Islands. Propose an explanation for this observation.