

Thème 1 – La Terre dans l'Univers, la vie, l'évolution du vivant

1-A – Génétique et évolution

Galapagos finches.

Use document 1 to expose Darwin's point of view, then suggest an explanation for the changes in beak sizes between 1976 and 1978.

Document 1: extract from 'The Origin of Species' by Charles Darwin.

The most striking and important fact for us in regard to the inhabitants of islands, is their affinity to those of the nearest mainland, without being actually the same species. [In] the Galapagos Archipelago... almost every product of the land and water bears the unmistakable stamp of the American continent. There are twenty-six land birds, and twenty-five of these are ranked by Mr. Gould as distinct
5 species, supposed to have been created here; yet the close affinity of most of these birds to American species in every character, in their habits, gestures, and tones of voice, was manifest...

The naturalist, looking at the inhabitants of these volcanic islands in the Pacific, distant several hundred miles from the continent, yet feels that he is standing on American land. Why should this be so? Why should the species which are supposed to have been created in the Galapagos Archipelago, and
10 nowhere else, bear so plain a stamp of affinity to those created in America?

There is nothing in the conditions of life, in the geological nature of the islands, in their height or climate, or in the proportions in which the several classes are associated together, which closely resembles the conditions of the South American coast: in fact there is considerable dissimilarity in all these respects.

15 On the other hand, there is a considerable degree of resemblance in the volcanic nature of the soil, in climate, height, and size of the islands, between the Galapagos and Cape de Verde Archipelagos: but what an entire and absolute difference in their inhabitants! The inhabitants of the Cape de Verde Islands are related to those of Africa, like those of the Galapagos to America. I believe this grand fact can receive no sort of explanation on the ordinary view of independent creation; whereas on the view here
20 maintained, it is obvious that the Galapagos Islands would be likely to receive colonists, whether by occasional means of transport or by formerly continuous land, from America; and the Cape de Verde Islands from Africa; and that such colonists would be liable to modification;—the principle of inheritance still betraying their original birthplace.

Document 2: Finches and seeds...

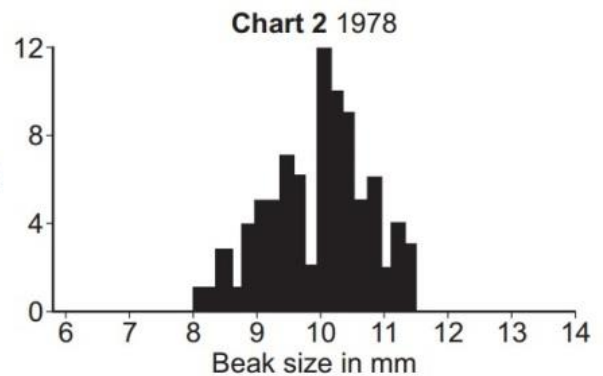
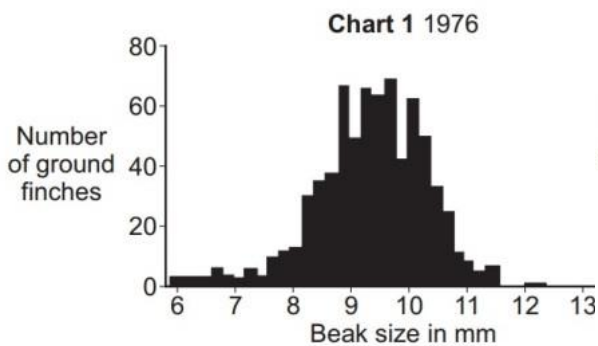
The Galapagos Islands are in the Pacific Ocean, 1400 km from South America.

The size of the seeds the ground finch can eat depends on the size of the beak.
 To eat large seeds, a large beak is needed.
 The bar charts show the sizes of the beaks of ground finches on one island, in 1976 and in 1978.

A type of bird called a ground finch lives on the islands. The picture shows a ground finch.



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Document 3:

The population of the ground finches and their beak sizes changed between 1976 and 1978. In 1977 there was very little rain on the island. The lack of rain affected the seeds that the finches ate. The table shows how the seeds were affected.

Year	Mean* number of seeds per m ²	Mean mass of each seed in mg
1976	8.5	3.5
1978	2.8	4.2

* Mean = average.