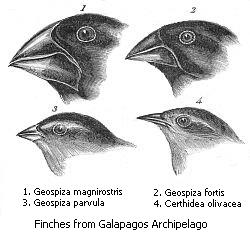
**Species Variation**  Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The following exercise was edited from <http://www.sciencecases.org/darwins_finches/prelude.asp>.

There are 13 finch species that live on the Galapagos Islands. They include 6 species of ground finches, 3 species of tree finches, 1 woodpecker finch, 1 vegetarian finch, 1 mangrove finch, 1 Coco Island finch, a warbler finch that looks more like a warbler than a finch (one of the tree finches) and the woodpecker finch actually uses cactus spines to dig grubs out of branches! Scientists Peter and Rosemary Grant have studied many of these species for the past thirty years, spending months at a time on the islands and often know every finch on an island. Peter and Rosemary Grant collected data such as beak depth,.

In a normal year in the Galapagos region, 130 mm of rain would fall. Over one three year period, the Grants focused their study on ground finch. In year 1, 137 mm of rain fell. In year 2, as in most years, some rain feel the first week of January but during the rest of January, there was one small shower. The total rainfall for the entire years was 24 mm.

With the change in weather, also came the changes in resources for the ground finch. The ground finches feed on seeds. In year 1 June of the study, 1m2 of lava on the island had over 10 grams of seeds. During year 2 June, that was reduced to 6 grams of seeds per m2. By December year 2, there were 3 grams of seeds per m2. In the drought, the plants conserved their resources and did not produce new seeds. Similarly, the finches did not mate and did not produce eggs in Year 2.

A variety of seeds are produced on the island. Finches prefer the softest seeds, which are the easiest to open. The seeds of a plant called Caltrop, in the genus *Tribulus,* are among the hardest to eat. It takes a medium ground finch with a beak at least 11mm long to open one. Ground finches with beaks that are 10.5mm long or less *haven’t even been seen trying to eat them.*

On one day in January of Year 3, more than 50mm of rain fell on the island. The plants finally flowered and produced new seeds. The Grants and their colleagues returned to the Galapagos. They found the finch population had been reduced. No new finches hatched in Year 2. Only one finch born in Year 1 survived to Year 3.

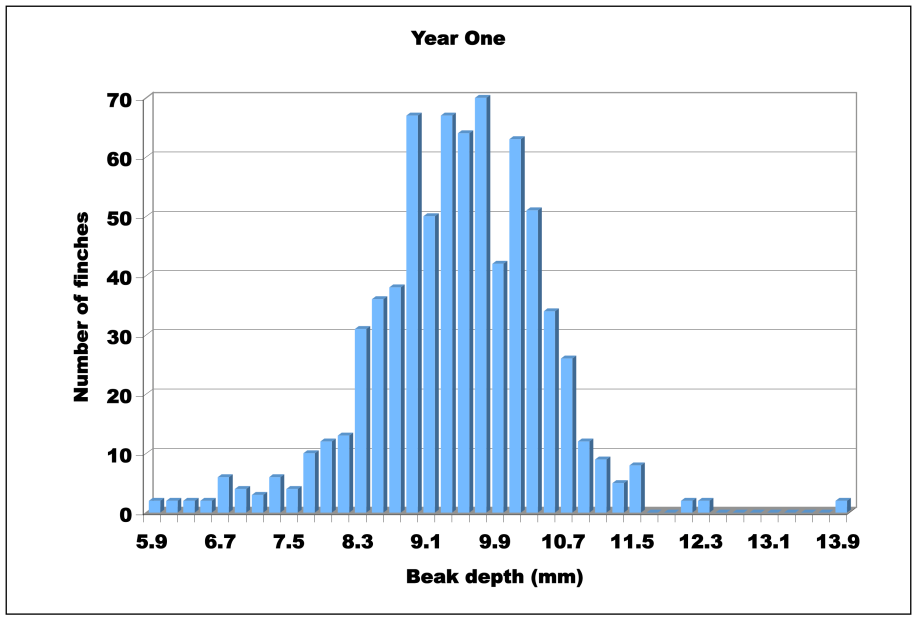
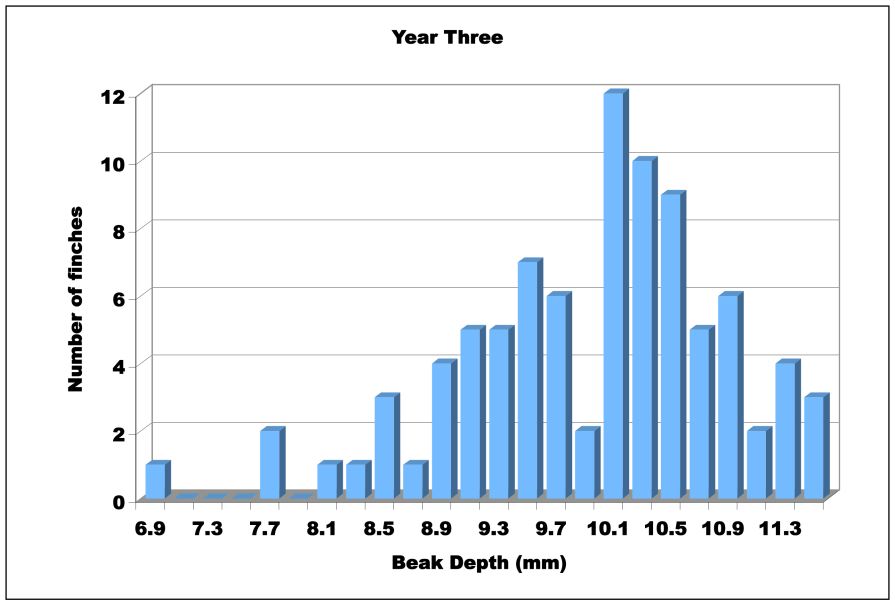


Figure 1 Figure 2

1. From figure 1, most finches’ have which beak depth in Year 1?

A: about 7.2 mm

B: about 8.2 mm

C: about 9.8 mm

D: about 10.2 mm

E: about 11.2 mm

1. Using data from figure 1, what is the difference between maximum and minimum beak depths?

A: 2 mm

B: 4 mm

C: 6 mm

D: 8 mm

E: 10 mm

1. Using figure 1 and 2: how did the pattern of beak depth change over 3 years of natural selection?

A: increase

B: decrease

C: stayed the same

D: Just under 10mm

E: can not be determined from the data

1. Using the axis in Figure 1 and 2 as a guide: A graph of the finch population size (over a 3 year period) would look like.

A B C D

Time Time Time Time

Answer is: A B C D

Using the data and the reading, answer the following true/false questions.

5. A single weather event cannot cause evolution, even if there are traits that affect survival and if there is variation in those traits.

1. true
2. false

6. As little as 0.3 millimeters can make the difference between life and death.

1. true
2. false

7. If beak depth increased during the drought, primarily due to selective mortality, can we really say that this natural selection was driven by environment favoring the survival of birds with deeper beaks?

1. No. Beak depth changed due to birds dying, not to birds surviving.
2. Yes. Birds with deeper beaks survived at a higher rate than birds with shallower beaks.
3. This does not suggest that Evolution or Natural Section is working
4. Beak depth decreased over the 3 year period which shows that the drought had no effect on the finches