

Darwin’s Finches Skills Practice

Read, annotate, and complete each section.

All species of Darwin’s finches are closely related, having derived recently from a common ancestor. They live in the largely undisturbed environment in which they evolved, and none have become extinct as a result of human activity. One of the most discernible characteristics of the finches are their beak sizes and shapes. Figure 1 illustrates the finches observed by Darwin on the Galapagos Islands.

English name	Scientific name	Occurrence (islands) (breeding/extinct)	Body size (g)	Diet
Small ground finch	<i>Geospiza fuliginosa</i>	14/0	14	Mainly granivorous
Medium ground finch	<i>Geospiza fortis</i>	13/0	20	Mainly granivorous
Large ground finch	<i>Geospiza magnirostris</i>	12/2	35	Mainly granivorous
Cactus ground finch	<i>Geospiza scandens</i>	12/0	21	Mainly granivorous, flowers/nectar
Large cactus finch	<i>Geospiza conirostris</i>	2/0	28	Mainly granivorous
Sharp-beaked ground finch	<i>Geospiza difficilis</i>	6/4	20	Granivorous and insectivorous
Small tree finch	<i>Camarhynchus parvulus</i>	10/0	13	Mainly insectivorous
Medium tree finch	<i>Camarhynchus pauper</i>	1/0	16	Mainly insectivorous
Large tree finch	<i>Camarhynchus psittacula</i>	9/1	18	Mainly insectivorous
Vegetarian finch	<i>Platyspiza crassirostris</i>	8/2	34	Almost entirely herbivorous
Woodpecker finch	<i>Cactospiza pallida</i>	6/0	20	Mainly insectivorous
Mangrove finch	<i>Cactospiza heliobates</i>	2/0	18	Mainly insectivorous
Warbler finch	<i>Certhidea olivacea</i>	17/0	8	Insectivorous: small arthropods and nectar
Cocos finch	<i>Pinaroloxias inornata</i>	1/0	16	Omnivorous

Figure 1

- (IOD 302) As it is used in the passage, the term *discernible* means:
 - ideal
 - hidden
 - noticeable
 - common
- (IOD 201) Which type of finch weighs less than 10 grams?
 - Woodpecker finch
 - Mangrove finch
 - Warbler finch
 - Cactus ground finch
- (IOD 301) How many finches were observed by Darwin on the Galapagos Islands?
 - 8
 - 10
 - 12
 - 14
- (IOD 301) Of the insectivorous finches, which one has the largest body mass?
 - Woodpecker finch
 - Mangrove finch
 - Small ground finch
 - Large ground finch

Figure 2 is a scatterplot that illustrates the average beak depth in a population of finches when related to the maximum hardness of seeds they can crack with their beaks.

5. (IOD 201) According to the trend line on the graph, a bird with a beak depth of 2.0 can crack a seed with a hardness of-
- 0
 - 0.5
 - 1.0
 - 1.5

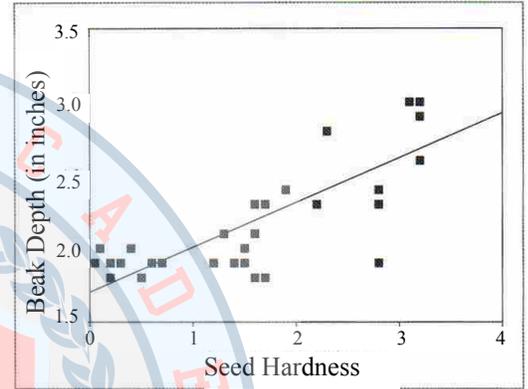


Figure 2

6. (IOD 301) When compared to a beak depth of 2.0, birds with a beak depth of 3.0 can-
- crack more seeds
 - crack harder seeds
 - crack less seeds
 - crack softer seeds

Figure 3(a) illustrates the total number of medium ground finches with beaks in each size class, before a drought.

7. (IOD 201) How many medium ground finches had beaks with a depth of 9.3?
- 40
 - 45
 - 30
 - 35

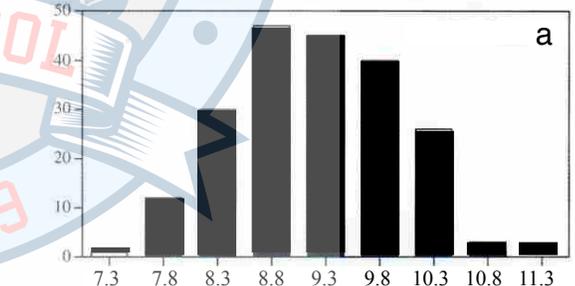


Figure 3(b) shows the number of finches that survived immediately following the drought.

8. (EMI 401) Which of the following conclusions is supported by the data?
- Finches with beak depths exceeding 10.3 were the most well adapted to drought conditions.
 - Finches with beaks depth below 7.8 were the most well adapted to drought conditions.
 - Finches with beak depths between 8.3 and 9.3 were the most well adapted to drought conditions.
 - Finches had a equal chance of survival during drought conditions.

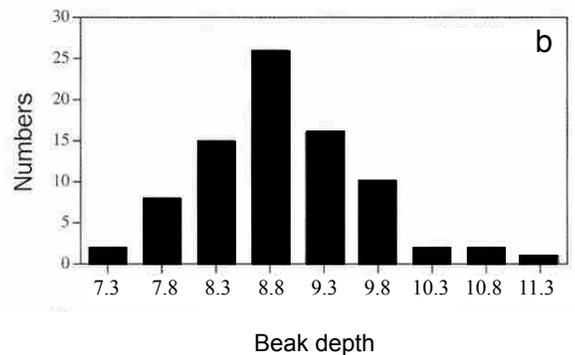


Figure 3

Finch Data

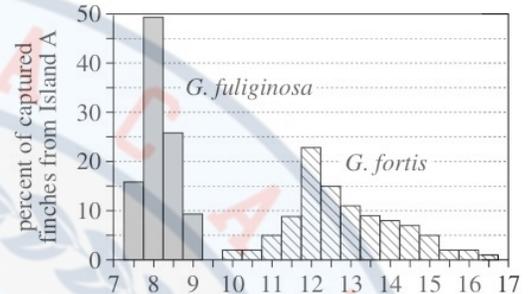


Figure 1

Finch beak depth (see Figure 1) is an *inherited* trait (it can be passed from parents to offspring). Researchers studied the beak depth of 2 species of finches, *G. fortis* and *G. fuliginosa*. Both species live on Island A. *G. fortis* alone lives on Island B, and *G. fuliginosa* alone lives on Island C. For both species, the primary food is seeds. Birds with shallower beaks can efficiently crush and eat only small seeds. Birds with deeper beaks can crush and eat both large and small seeds, but they prefer small seeds.

Study 1

Researchers captured 100 *G. fortis* finches and 100 *G. fuliginosa* finches on Island A. They tagged each bird, measured its beak depth, and released it. Then they calculated the percent of birds having each of the beak depths that had been measured. The researchers followed the same procedures with 100 *G. fortis* finches from Island B and 100 *G. fuliginosa* finches from Island C. The results from this study are shown in Figure 2.



Study 2

After completing Study 1, the researchers returned to Island B each of the next 10 years, from 1976 to 1985. During each visit, the researchers captured at least 50 *G. fortis* finches and measured their beak depths. Then they calculated the average *G. fortis* beak depth for each of the next 10 years. The researchers noted that, during the 10-year period, 3 years were exceptionally dry, and 1 year was very wet (see Figure 3). Small seeds are plentiful during wet years. During dry years, all seeds are less plentiful, and the average size of the available seeds is larger.

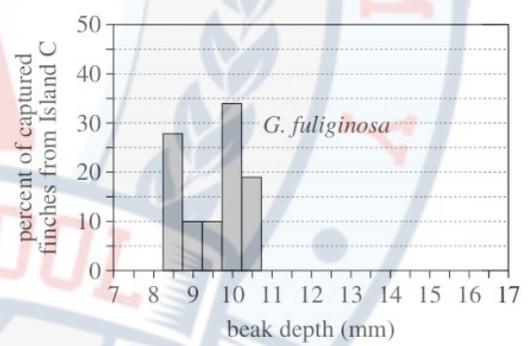
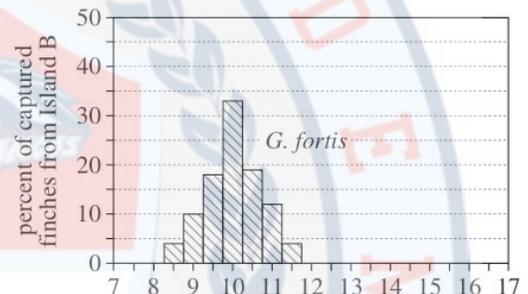


Figure 2

- (IOD 201) According to Figure 2, about 25% of *G. fortis* finches from Island A had a beak depth of:
 - 7 mm
 - 8.5 mm
 - 12 mm
 - 13.5 mm
- (IOD 201) According to Figure 3, the year with the smallest beak depth is:
 - 1976
 - 1978
 - 1979
 - 1984

- (IOD 301) Based on the results of Study 1, the highest percent of finches on Island B and Island C had a beak depth of:

	Island B	Island C
a.	8 mm	8 mm
b.	9 mm	12 mm
c.	10 mm	8 mm
d.	10 mm	10 mm

- (IOD 303) During which of the following years were small seeds likely most abundant on Island B?
 - 1977
 - 1980
 - 1982
 - 1984

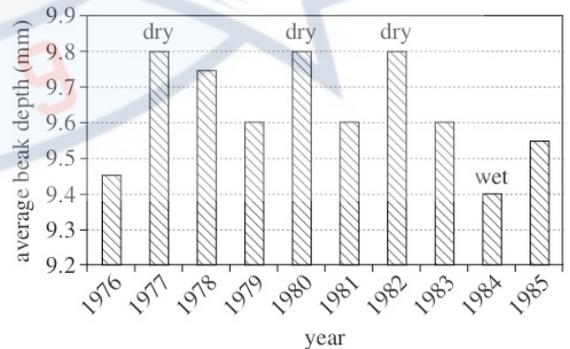


Figure 3

Name: _____

Date: _____

Period: _____

5. (SIN 301) The researchers recorded the climate of Island B each year in Study 2 to:
 - a. determine if climate affected the seeds available, and thus the beak depth.
 - b. gather more information about the habitat of Island B.
 - c. gather rainfall data for future studies about Island B.
 - d. determine how much water was available to the finches to drink that year.

6. (SIN 301) In Study 2, why was it important that the researchers captured and measured 50 finches every year?
 - a. Because 50 was a manageable number that gave them good results.
 - b. Because they needed to measure half the number of finches that were measured in Study 1.
 - c. Because they measured beak depth, so all other variables had to be kept constant.
 - d. Because 50 finches was all they could capture and measure during that time period.

7. (IOD 304) According to Figure 2, as the beak depth of *G. fortis* on Island B increases, the proportion of finches:
 - a. increases only
 - b. decreases only
 - c. increases then decreases
 - d. decreases then increases

8. (IOD 303) How many finches were captured and measured from Island A in Study 1?
 - a. 50
 - b. 100
 - c. 150
 - d. 200

