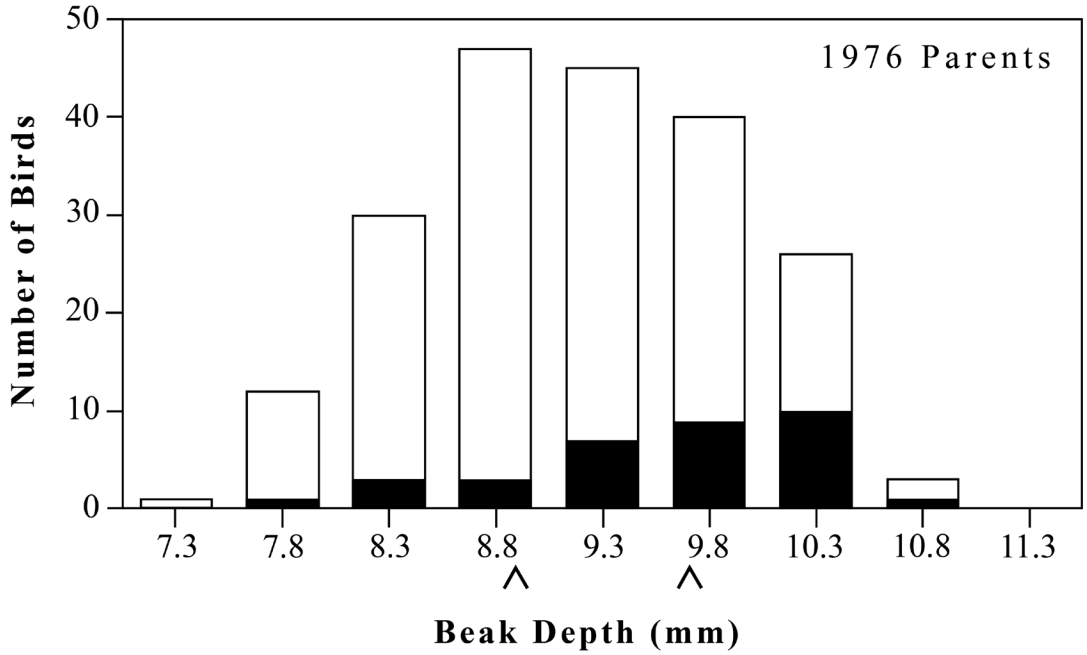
HOW TO USE THIS RESOURCE

Show the figure below to your students along with the caption and background information. The "Interpreting the Graph" and "Discussion Questions" sections provide additional information and suggested questions that you can use to guide a class discussion about the characteristics of the graph and what it shows.



Caption: Distribution of beak depths of medium ground finches (Geospiza fortis) on the island of Daphne Major in 1976 (white bars) and of the survivors of the 1977 drought (black bars). The means of the two populations are indicated by the carets.

BACKGROUND INFORMATION

Rosemary and Peter Grant performed a series of long-term studies on the finches living on the island of Daphne Major in the Galápagos Islands. With its short, blunt beak, the medium ground finch (*Geospiza fortis*) is adapted to picking up seeds from the ground. In 1976, seeds on the island were diverse and plentiful. However, during a drought in 1977, seeds became more scarce. Once the finches had eaten all the small and medium-sized seeds, they had to turn to larger, spiny seeds that are hard to crack open. The graph above shows the distribution of beak depths of the finch population before the drought (white bars) and after the drought (black bars).

INTERPRETING THE GRAPH

The white bars represent the number of finches with a particular beak depth in 1976. The black bars indicate the number of finches with a particular beak depth that survived the drought. The carets below the *x*-axis indicate the mean beak depth of the 1976 population, before the drought (left caret), and the mean beak depth of the drought survivors (right caret). The graph shows that there were fewer drought survivors than the original population and that, on average, the drought survivors had a greater beak depth (i.e., larger beaks) than the original population.

Teacher Tip: Prompt your students to explain the parts of the graph as applicable:

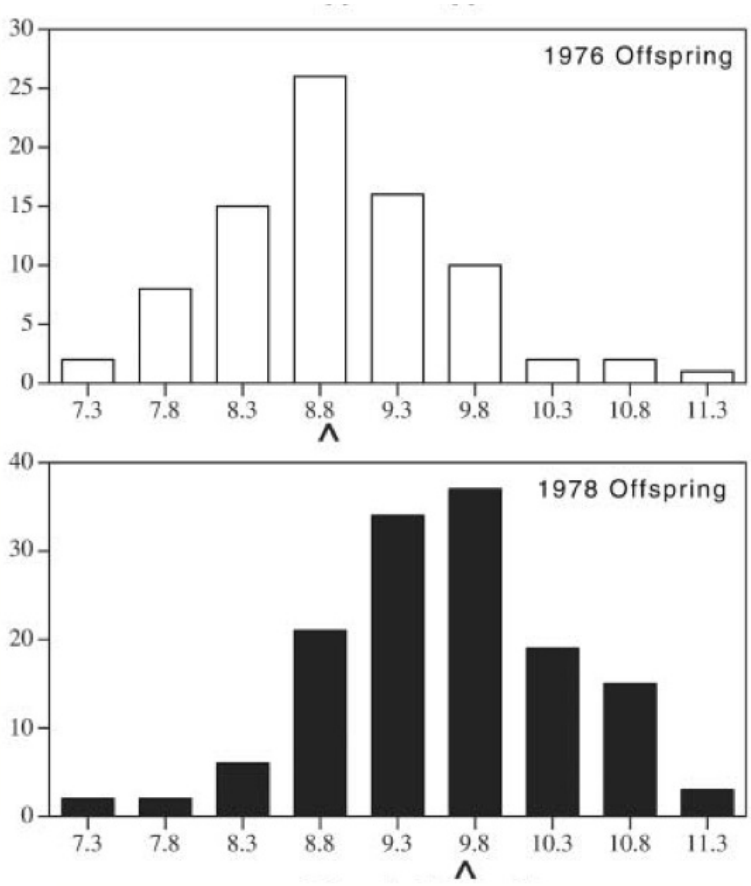
- Graph Type: Histogram

- X-Axis: Measurement of beak depth (in millimeters) binned in increments of 0.5 mm
- Y-Axis: Number of finches
- Distribution (Initial Population): The beak depths of the initial population range from 7.3 mm to 10.8 mm. The mean is just above 8.8 mm and the mode is 8.8 mm. The data appears to be normally distributed.
- Distribution (Drought Survivors): The beak depths of the drought survivors range from 7.8 mm to 10.8 mm. The mean is just below 9.8 mm and the mode is 10.3 mm. The data appears to be left-skewed.

DISCUSSION QUESTIONS

- Make observations about the original population and the survivors:
  - How does the size of the population differ?
  - How do the beak depth distributions differ?
  - How do the means differ?
- How did the medium ground finch population change after the drought?
- Why do you think the Grants wanted to look at beak depth before and after the drought?
- Why do you think the mean depth of the finch beaks is higher in the finches that survived the drought?
- If the finches that survived the drought reproduced, make a prediction about what the distribution of beak depths of the offspring would look like. How would this compare to the beak depth of the offspring that were hatched before the drought?

  After students make a prediction, show them the figure to the right. It shows the distributions of beak depths of fully grown offspring hatched in 1976 and 1978. The difference in the means of these two graphs (the birds hatched before the drought in 1976 and the birds hatched in 1978) is a measurement of evolutionary change between generations.



SOURCE

Figure 5 from:
Rosemary B. Grant and Peter R. Grant. What Darwin's Finches Can Teach Us about the Evolutionary Origin and Regulation of Biodiversity. BioScience. 2003. 53: 965-975.
View Paper: http://bioscience.oxfordjournals.org/content/53/10/965.full.pdf+html

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