Chapter Project

Birds of a Feather Evolve Together

"Over the past four decades, evolutionary biologists Rosemary and Peter Grant have documented the evolution of the famous Galápagos finches by tracking changes in body traits directly tied to survival, such as beak length, and identified behavioral characteristics that prevent different species from breeding with one another. Their pioneering studies have revealed clues as to how 13 distinct finch species arose from a single ancestral population that migrated from the mainland 2 million to 3 million years ago."

A video detailing the changes in these species that have evolved can be found at either of the following websites. View the video about this research prior to beginning the project.
http://media.hhmi.org/biointeractive/interactivevideo/finchquiz/?_ga=2.36754469.465667716.1528204380-868970706.1528204380 or https://www.youtube.com/watch?v=mcM23M-CCog

As you learn more about analyzing data, you will find that the type of data presented will dictate which types of graphs you will create, which types of statistics you can calculate, and which types of inference can be done. You will use a sample of the finch data, which can be found on stat.hawkeslearning.com, to identify types of variables. Definitions of the variables can be found on the next page.

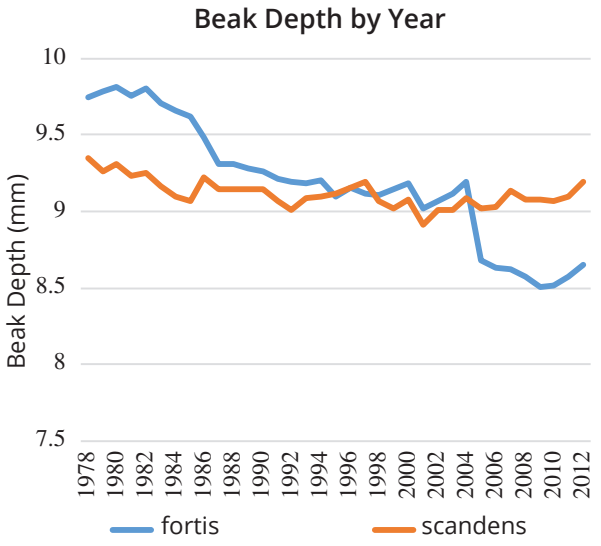
Data

The data can be found at stat.hawkeslearning.com **Data Sets > Finch Data.**

1. Were the Grants conducting an experiment or observational study on these finches?
2. If we were trying to determine the relationship between sex and weight, which variable would be the explanatory variable and which variable would be the response variable?
3. Identify each variable in the data set as:
   a. Qualitative or quantitative
   b. Continuous, discrete, or neither
   c. Nominal, ordinal, interval, or ratio
4. A second set of data the Grants collected is various averages per year (Finch by Year Data). This data can be used to show changes in the finches over time. The following graph highlights beak depth for two species of finches on the Galapagos from 1978 to 2012.

Data

The data can be found at stat.hawkeslearning.com **Data Sets > Finch by Year Data.**



   a. Does this graph represent time-series or cross-sectional data?
   b. Is there a noticeable trend in the change of beak depth from 1978 to 2012 for the fortis species?
   c. Is there a noticeable trend in the change of beak depth from 1978 to 2012 for the scandens species?

Source: https://www.hhmi.org/biointeractive/the-origin-of-species-the-beak-of-the-finch

Band refers to an individual's identity, more specifically, the number on a metal leg band it was given.

Species name is Geospiza fortis, which is the medium ground finch.

Sex is indicated as male, female, or unknown. The reason for the "unknown" category is that males start their lives looking like females. After one or more years they molt into a plumage with some black feathering that indicates they are males.

The variable **First adult year** refers to the year after the individual hatched from an egg.

The variable **Last year** refers to the last year of that individual's life. Fifty individuals did not survive beyond 1977, the year of the drought, whereas 50 survived to 1978 and later years.

The next six columns provide the morphological measurements of individuals in the group that died in 1977 and in the group that survived.

Weight is in grams; the other measurements are in millimeters.

Tarsus is a part of the leg.