Name_____

DATA Nugget

Bye bye birdie? Part I

Featured scientist: Richard Holmes from the Hubbard Brook Experimental Forest

Research Background:

The Hubbard Brook Experimental Forest is an area where scientists have collected ecological data for many years. It is located in the White Mountains of New Hampshire, and data collected in this forest helps uncover trends that happen over long periods of time. It is important to collect data on ecosystems over time because these patterns could be missed with shorter experiments.

Each spring, Hubbard Brook comes alive with the arrival of migratory birds. Many migrate from the tropics to take advantage of the abundant insects and the long summer days of northern areas, which are beneficial when raising young. **Avian ecologists** are scientists who study the ecology of birds. They have been keeping records on the birds that live in the experimental forest for over 40 years. These data are important because they represent one of the longest bird studies ever conducted!

Richard is an avian ecologist who began this study early in his career as a scientist. He was interested in how bird populations were responding to long-term environmental changes in Hubbard Brook. Every summer since 1969, Richard has taken his team of trained scientists, students, and technicians into the field to count the number of birds that are in the forest and identify which species are present. Richard's team monitors

Male Black-throated Blue Warbler feeding nestlings. Nests of this species are built typically less than one meter above ground in a shrub such as hobblebush. Photo by N. Rodenhouse.

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populations of over 30 different bird species. They wake up every morning before the sun rises and travel to the far reaches of the forest. They listen for, look for, identify, and count all the birds they find. The team has been trained to be able to identify the birds by sight, but also by their calls. Team members are even able to identify how far away a bird is by hearing its call! The scientists record the number of birds observed in four different study areas, each of which are 10 hectare in size — roughly the same size as 19 football fields. Each of the four study areas contains data collection points that are arranged along **transects** that run east to west through the valley. Transects are parallel routes along which the measurements are taken. Each transect is approximately 500 meters from the next. At certain points on each transect, an observer stands and records all birds seen or heard during a ten-minute interval, and estimates the distance the birds are from the observer. The entire valley is covered three times a season. By looking at bird abundance data, Richard and his colleagues can identify trends that reveal how avian populations change over time.

Scientific Question: How has the total number of birds at the Hubbard Brook Experimental Forest changed over time?

Scientific Data:

Use the data below to answer the scientific question

Year	Total number of birds counted / study area
1969	158
1970	163
1971	212
1972	214
1973	192
1974	161
1975	201
1976	194
1977	187
1978	149
1979	147
1980	131
1981	117
1982	124
1983	118
1984	89
1985	116
1986	91
1987	85
1988	113
1989	101
1990	133
1991	120
1992	130

Year	Total number of birds counted / study area
1993	94
1994	84
1995	72
1996	93
1997	87
1998	72
1999	85
2000	89
2001	91
2002	71
2003	89
2004	76
2005	96
2006	108
2007	100
2008	92
2009	106
2010	108
2011	95
2012	105
2013	120
2014	113
2015	114

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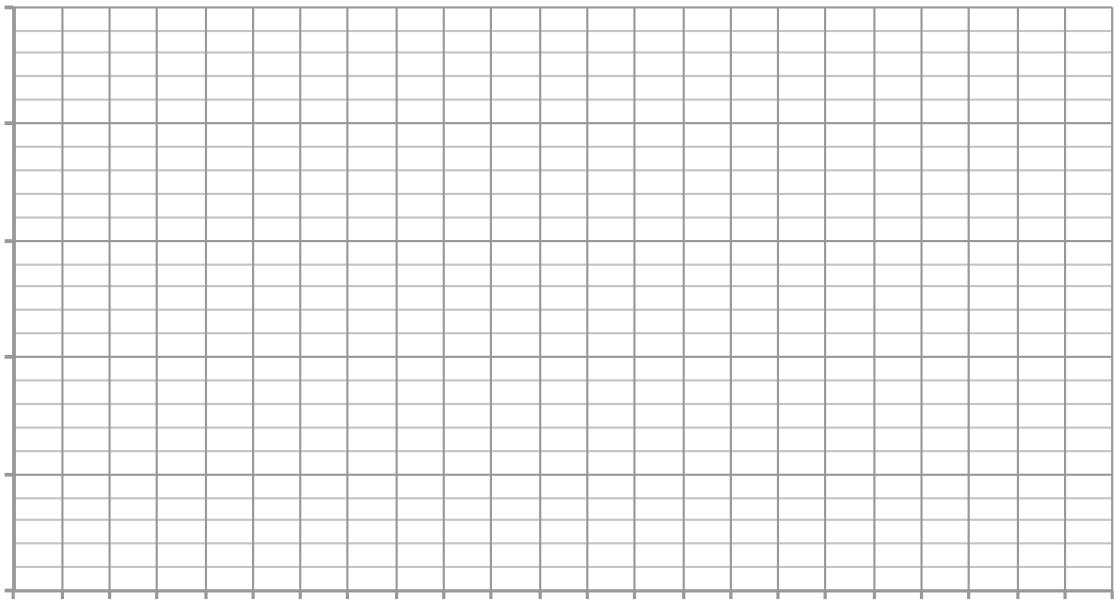
What data will you graph to answer the question?

Independent variable: _____

Dependent variable: _____

Draw your graph below: Identify any changes, trends, or differences you see in your graph. Draw arrows pointing out what you see, and write one sentence describing what you see next to each arrow.



Interpret the data:

Make a claim that answers the scientific question.

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What evidence was used to write your claim? Reference specific parts of the tables or graph.

Explain your reasoning and why the evidence supports your claim. Connect the data back to what you learned about long-term datasets and what they can tell us about bird populations.